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April 24, 2013

P.N. 94024.69

Mr. Brad Ricks Virginia Department of Environmental Quality 4949-A Cox Road Glen Allen, VA 23260

RE: Coles Point Wastewater Treatment Facility

VPA Permit Renewal

Westmoreland County, Virginia

Dear Mr. Ricks:

The enclosed document is a request for renewal of the Coles Point VPA Permit, which expires in 180 days. We have attempted to provide a complete document, but the recent addition of the Biosolids use may require modifications or corrections to the Nutrient Management Plan.

We look forward to your timely review of this information. Please call me at the number shown above if you have any questions or if additional information is needed..

Sincerely,

B. Meredith Winn, Jr., P.E.

Senior Process Engineer

B. Muslering

/aw

cc: Mr. Norm Risavi - Westmoreland County

Enclosure



Piedmant Reflectal Office

EXECUTIVE SUMMARY

Purpose

APR 2 4 2018

The County of Westmoreland, Virginia, has developed a community wastewater treatment facility for the community of Coles Point, and has operated the facility since 2003 under VPA Permit No. VPA-01423. This document is a Virginia Pollution Abatement Permit (VPA) application for the renewal of this permit.

Service Area

The Coles Point wastewater service area encompasses the land area north of the treatment facility as shown in the drawings. The treatment facility, including the treatment units and the irrigation spray fields, is located on the east and west sides of Route 612, approximately 1.5 miles south of Route 724. The service area is bounded on the north and east by the Potomac River, on the west side by the Lower Machodoc Creek, and on the south by Gardner Creek.

Operations

The wastewater system is a zero discharge facility, utilizing irrigation of croplands as the final disposal method, after treatment in a state-of-the-art Sequencing Batch Reactor (SBR).

Improvements

The equipment improvements since plant inception are as follows:

- 1. A third 3 mm gallon storage tank has been added next to the existing storage tanks. This was added to ensure winter storage capacity and more flexibility in operations.
- 2. Low Profile Screens were designed and installed for the existing tanks to increase drawdown and reduce vortexing. The new tank also has a sump to further increase drawdown.
- 3. Electric mixers were installed in one existing storage tank and the new tank, to assure proper disinfection.
- 4. A parallel pipeline was installed to the irrigation fields and connected to the spare pump.

 Now the spare pump can be put to use irrigating a second field at the same time as the other field. This allows more flexibility in irrigation.
- 5. A method for pumping liquid bleach into the tanks was instituted when it became apparent that the tanks of treated wastewater would re-infect themselves during periods of inactivity. The use of chlorine gas was discontinued.

Permit Change Requests

It is requested that the new permit waive the requirement for less than 2 inches per week irrigation on any one field. This requirement has the potential for not allowing irrigation to proceed on dry fields. The facility has portable moisture sensors that can tell for sure if the field is ready for irrigation. Since the maximum rate of irrigation is only 0.14 inches per hour, the chance for run-off is negligible. In the heat of the summer day, much of the spray evaporates.

It is also requested that the plant be allowed to utilize the biosolids it creates to enhance tilth and fertility of bare spots in the fields, by spreading and discing. It is suggested that this on-site usage could be integrated into the same permit with the existing permit.

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- C Soil Boring Logs
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- E Process Flow Diagram
- F Facility Layout with Topography
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VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION FORM A

1.	Facility Name:	Coles Point Wastewater Treatment System
	County and Location:	Westmoreland County, Virginia State Route 612
	Address:	2585 Coles Point Road Hague, VA 22469
	Telephone Number: Email	804.472.9240 cpwaste@verizon.net
2.	Legal Name of Owner:	Westmoreland County
	Address:	P.O. Box 1000 Montross, VA 22520
	Telephone Number:	(804) 493-0130
3.	Facility Contact:	Mr. Norm Risavi
	Title:	County Administrator
	Address: (if different)	same
	Telephone Number:	(804) 493-0130
4.	Existing Permits (e.g., IWN	D, VPA, NPDES; RCRA; UIC; PSD; other:)
	VDEQ VPA	01423
	Agency Permit Typ	e Number
	Agency Permit Typ	ne Number
	Agency Permit Typ	oe Number
5.	Nature of Business:Tre	atment of municipal wastewater
		: :

6.	Type of Waste: (check blank as appropriate)	Proposed	Existing
	Animal Waste (complete Form B)		
	Industrial Waste (complete Form C)		
	Sewage Effluent (complete Form D, Part I)		X
	Sewage Sludge Infrequent Land Application (complete Form D, Part II)	<u> </u>	
•	Sewage Sludge Frequent Land Application (complete From D, Part III)		
7.	General Location Map:		
	Provide a general location map which clearl	y identifies the location	of the facility.
	A general location map is enclosed.		
person person inform comple includi	Ty under penalty of law that this document and my direction or supervision in accordance with nel properly gather and evaluate the informate or persons who manage the system or those plation, the information submitted is to the best etc. I am aware that there are significant penalting the possibility of fine and imprisonment of thorized signatory as specified in the Permit February of the supervision of the permit February and the permit February as specified in the Permit February and the permit February and the permit February and the permit February as specified in the Permit February and the per	th a system designed to a consubmitted. Based or persons directly respons t of my knowledge true, alties for submitting fals for knowing violations.	assure that qualified n my inquiry of the ible for gathering accurate and e information I further certify that I
Signati	ure:	Date: _ <i>4-2</i>	2-13
Printed	l Name: Norm Risavi		
Title:	County Administrator		

VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION

FORM D

MUNICIPAL WASTE

FORM D-1 LAND APPLICATION OF SEWAGE EFFLUENT

General Information

1. Facility Name

Coles Point Wastewater Treatment System

2. Wastewater Treatment Facility Description

Enclosed as part of this application is a line drawing (Sheet M-1, App.D) of the plant. The process consists of: (1) A flow splitter; (2) Dual sequenced batch reactors (SBR); (3) A post equalization basin; (4) Disinfection by Chlorination (liquid bleach); and (5) three Storage Tanks for over-winter storage and irrigation supply. Sludge produced from the treatment process is digested in an aerobic digester prior to being filtered on drying beds for disposal off-site. The treated effluent is used for crop irrigation and is pumped from the irrigation tanks to the spray fields.

The wastewater treatment facility is designed for a flow capacity of 150,000 gallons per day (gpd). This includes capacity for flows from the users to date as well as capacity for additional users in the service area which may be attributable to either additional signers from among existing development or wastewater flow from future development. The actual treatment unit was sized to handle approximately 200,000 gpd, in order to ensure that adequate capacity is available in case of unexpected higher than normal flows. Space is provided on the site for future expansion of the treatment facility and storage tanks, should future wastewater flow rates warrant such expansion.

The nature of the community is seasonally affected. Many of the homes are vacation homes and will thus not have significant generation of wastewater in the winter. After ten years of experience, the most recent year-round average is 20,402 gal/day, ranging from approximately 16,000 to 25,000 gpd on a monthly basis. See Typical monthly reports, appendix K and L.

Pre-Treatment Process

The pre-treatment process includes all unit processes which process (or treat) the raw wastewater to the required level of treatment to allow the effluent to be land applied. The unit processes in the pre-treatment portion of the facilities includes the preliminary

treatment unit (deodorization), the sequential batch reactor (SBR) process, and the disinfection process.

Wastewater pumped to the treatment facility will be discharged into the preliminary treatment unit, which consists of flow splitting and odor control units. The flow splitter will serve two purposes: 1) to split and direct influent wastewater to the two SBR basins and to serve as an agitation area for pick-up of any odors that may be present in the raw wastewater for further treatment by the odor control unit. The flow splitter box is connected by piping to the two SBR basins with motorized valves to control flows to each of the two basins. As raw wastewater is discharged into the flow splitter box, the agitation of the discharge will cause any sewer gases which may contain odors to be released. An odor control blower will pick up the air from the flow splitter box through the blower's suction piping. The blower will discharge the air through piping to the odor control unit which consists of a carbon filter. The filtered air will then be discharged to the atmosphere.

The SBR process is a fill and draw variation of the conventional activated sludge biological process. It consists of aeration, sedimentation, and clarification. The SBR process performs wastewater treatment in batches within two reactor basins. Two SBR reactor basins are provided in order to maintain continuous treatment capability. While one SBR reactor is processing wastewater, the other reactor tank will be filling or in a standby mode. Mixing and air are applied to the wastewater in the tanks in accordance with pre-programmed phases. Air is supplied from a series of blowers discharging to the tanks through piping and air diffusers. Mixing is applied using surface mechanical mixers. Settling of quiescent tank contents and removal of settled solids (sludge) from the bottoms of the reactor basins are also programmed to occur in timed phases. The clarified effluent from the SBR basins, with solids and organics removed to meet land application effluent quality, is transferred to the post equalization basin where it is temporarily stored prior to disinfection.

The SBR process is operated by automatic controls, timers, and/or level switches. Since the system is operated automatically except for periodic maintenance, the wastewater plant operator will have the flexibility to perform multiple duties while at the wastewater treatment facility. The treatment unit, an SBR designed by Aqua - Aerobic Systems, Inc. (AASI), has the following cycle times and detention: The AASI design document is based on an average design flow of 0.203 MGD, with a maximum hydraulic design flow of 0.504 MGD.

The hydraulic detention time is 1.133 days at average water depth in the SBR. The number of cycles is 5 per day per basin, with a 4.8 hour cycle. Solids retention time is 17.1 days in the SBR. The active volume of the post equalization basin is approximately 28,000 gallons. The aerobic digester design is based on 20.5 days solids detention.

The effluent in the post equalization basin is transferred to the effluent storage tanks

where it is stored for land application. The transfer and storage operation will also involve the disinfection process. The treated effluent from the SBR units will be pumped by a transfer pump, and will have liquid chlorine bleach added for disinfection. The chlorine liquid will be stored in drums delivered to the site. It will be applied through a metering pump. Mixing of the chlorine with the treated effluent and contact times will be achieved in the piping and in the storage basins. Liquid chlorine bleach is also used for re-chlorination of the tanks' contents prior to irrigation. The storage tanks are agitated with retrievable mixers.

The pre-treated liquid effluent is sprayed onto the fields according to an approved nutrient management plan (NMP).

3. Disposal of Solid Waste Materials

The sludge handling process consists of an aerobic digester, a polymer addition system, sludge filter beds, the plant drain pump station, and the related pumps and appurtenances. Settled solids in the SBR reactor basins are pumped by individual pumps to the sludge digester. The sludge is aerated in the digester by air supplied by a blower which discharges through piping and diffusers. The storage time of the sludge in the digester and the air applied provides stabilization of the sludge solids. The sludge will be periodically transferred from the digester basin to the sludge filter beds for dewatering. Polymer will be added to the sludge as needed to aid the dewatering process. Sludge spread onto the surface of the two filter beds will dewater through filtration through the filter media and surface drying. Filtrate from the filter beds will be collected and will flow to the plant drain pump station. The duplex pump station will pump the filtrate to the SBR reactor basins for mixing with the raw wastewater and further treatment. The dried sludge solids on the filter bed surface will be loaded into roll-off containers then onto trucks for transport to final disposal (a landfill or other permitted disposal facility). This application requests that the spreading of solids be allowed in addition to landfilling.

4. Industrial Contributors

There are no known industrial contributors to the wastewater treatment works.

5. Leasing

There are no known leasing agreements related to the treatment works and the use or management of application fields not under direct ownership of the applicant.

6. PVOTW Ownership

The Wastewater Treatment plant is not privately owned.

Design Information

Waste Characterization

7. Capacity

Over the past ten years, the flow has risen as more clients join the system. Also, the demographics of the newer joiners appear to be more year-round residents. Actual measurement of inflows from January 2012 through February 2013 shows the following: (See Appendices K and L)

Average Monthly Flow = 612,061 Gal (20,402 gpd) Minimum Month = 451,980 Gal (16,177 gpd)

Maximum Month = 782,770 Gal (25,251 gpd)

The facility was designed for an initial treatment flow of 150,000 GPD (based on DEQ requirements). The maximum average monthly flow of 25,251 GPD is only 17% of the design. Being as the flow is so small, the SBR only needs to operate on one cell.

There are currently 753 connections with plans for 464 additional. The current (April 2013) contribution to the effluent is 20402/753 = 27 gpd/EDU. The highest month is 24% higher, or 33 gpd/EDU. If we have 464 added EDU's at similar flows, the average flow would increase to 32,000 GPD average (40,000 GPD max month)..

Initial (2013) Flow -	27,000 GPD (maximum daily)
After Expansion Flow =	40,000 GPD (maximum daily)
Initial Treatment Design Basis	- 150,000 GPD (maximum daily)
SBR Design -	200.000 GPD

Hydraulic loading:	inches
Average Annual (after expansion)	8.5
Maximum Annual	10.6
Prior Limit	20
Daily Average	0.023
Daily Maximum	0.029
Weekly Average	0.161
Weekly Maximum	0.203

In this climatic situation, precipitation typically balances evaporation.

Irrigation water winter storage would need to accommodate 32,000 GPD for 120 days, or 3,840,000 gal. Since there are three 3mm gallon tanks, there would be 281 days effective storage capacity See Appendix H..

The above information shows that the 50.4 acres and 9,000,000 gallons storage are more

than double the expected hydraulic loading needs. Therefore if the expansion areas generate more than the expected flows, they can be accommodated by each facet of the system.

As noted, the maximum instantaneous irrigation is only 0.14 inches per hour. The permeability of the soils can handle this rate without runoff.

8. Effluent Characterization

The treated effluent is characterized on the attached Part D-III. The effluent is treated in an SBR followed by chlorination.

9 Nutrient Value

The typical expected nutrient values of the effluent are estimated as follows:

PAN	22.5 mg/L
P_2O_5	4.0 mg/L
K_2O	1.5 mg/L

The potential liming effects of the effluent are expected to be insignificant based on the pH and lack of lime addition to the treatment process.

Storage and Land Application Requirements

10. Storage and Land Application

Hydraulic loading:	inches
Average Annual (after expansion)	8.5
Maximum Annual	10.6
Prior Limit	20
Daily Average	0.023
Daily Maximum	0.029
Weekly Average	0.161
Weekly Maximum	0.203

In this climatic situation, precipitation typically balances evaporation.

Irrigation water winter storage would need to accommodate 32,000 GPD for 120 days, or 3,840,000 gal. Since there are three 3mm gallon tanks, there would be 281 days effective storage capacity.

The above information shows that the 50.4 acres and 9,000,000 gallons storage are more than double the expected hydraulic loading needs. Therefore if the expansion areas

generate more than the expected flows, they can be accommodated by each facet of the system.

As noted, the maximum instantaneous irrigation is only 0.14 inches per hour. The permeability of the soils can handle this rate without runoff.

11. Land Requirements

Based on previous calculations and historical data, the 50.4 acre tract is allowed 20 inches per year. It is expected that only an average of 11 inches is needed. Therefore the site is nearly twice as large as needed. Further information on the land requirements are included in the Nutrient Management Plan.

Site Characterization

12. Location Map

Figure 2 displays the location of the site for the wastewater treatment facility and spray irrigation fields. See Appendix A and G

13. Topographic Map

Figure 3 displays the USGS quadrangle map for the area with the outline of the site overlaid. Outlined to the west is future service area. Figure 7 shows current and future service areas. See Appendix F.

14. Site Plan

The enclosed drawing Sheet 6, indicates the layout for the wastewater treatment facility. Sheet C-3 shows modifications to the storage tanks. See Appendix F.

15. Soil Survey

The enclosed drawing - Layout Plan and Soil Borings, indicates the soil types found over the treatment plant site. Further descriptions are found in the NMP. See Appendix D.

16. Soil Borings

Soil samples have been taken of the site soils (hand augered to approximately 5 feet) at the inception of the facility. These boring descriptions are appended along with a location map. See Appendix C

17. Soil Samples

Soil samples from each of the spray irrigation fields have been collected and analyzed. Results are appended. In appendix N

Crop and Site Management

18. Nutrient Needs

Calculations for the crop nutrient needs are included in the Approved NMP. See Appendix B.

19. Cropping System

Calculations and details for the cropping system are included in the approved NMP.

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-II LAND APPLICATION OF BIOSOLIDS

General Information

- 1. Facility name. Coles Point Wastewater Treatment System
- 2. Process Description: A small amount of biosolids are produced by the treatment system (VPA 01423), approximately 10 20 tons per year, and is formed on duplex drying beds. Storage is made by utilizing the covered space of the bed. Currently the solids are hauled to a landfill. It is desired to utilize biosolids in the adjacent irrigation fields to enhance fertility. Since the usage fields are adjacent to the plant (immediately across the highway 612), it is proposed that a manure spreader be filled at the drying beds and pulled by tractor to the fields and immediately spread on the chosen field(s) by the manure spreader. The site would then be disced to incorporate the solids. No additional storage would be necessary. Biosolids are treated by the use of an aerated digester prior to filtration. No other "owners" would be involved.
- 3. Leasing agreements are not applicable.
- 4. The Owner is the local government, therefore no further certification should be needed..
- 5. The Owner of the land is the local government and is self insured.

Design Information

Waste Characterization

- 6. A biosolids characterization iis appended.
- 7. A Non-Hazardous Declaration Statement for the biosolids is included.ed.
- 8. Provide calculations describing the nutrient value of the biosolids as pounds per dry ton nitrogen (PAN), phosphorus (P_2O_5), potassium (K_2O), and Calcium Carbonate Equivalence, if applicable.

See appended information

- 9. Describe the current status of the available biosolids storage facilities. List in a tabular format the biosolids storage facilities by location, total storage capacity(s), and the biosolids contracts currently permitted or assigned to these facilities.
- There is no storage other than the covered drying beds which have the capacity to hold at least 6 months of biosolids
- 10. No plans for **routine** and **emergency** storage facilities of biosolids are necessary. If biosolids production grows beyond the field needs, it will be hauled to a landfill as is currently done.
- 11. Provide generic plans for on-site **temporary** storage. <u>No temporary storage beyond the drying beds is planned.</u>

12. Provide pertinent calculations justifying biosolids storage based on contractual agreements with biosolids generators, annual biosolids production, land area available, and an annual biosolids balance incorporating such factors as precipitation, evapotransporation, soil percolation rates, wastewater loading, monthly storage (input and drawdown).

No additional storage is planned.

Biosolids Transport

- 13. Provide a detailed description for each of the following:
 - a. Specifications on all bed and tank vehicles that will be used to transport biosolids from generators or storage to land application sites; No such vehicles will be used.
 - b. Routes to be used to transport biosolids from the generator(s) to storage unit(s); There is no such storage unit.
 - c. Procedures for biosolids off-loading at the biosolids facilities and the land application site together with spill prevention, cleanup, (including vehicle cleaning), field reclamation and emergency spill notification and cleanup measures
 - There is no truck off-loading, as the manure spreader will take the solids directly from the generating beds to the fields. No other preventive measures are considered necessary.
 - d. Voucher system to be used to document transport and delivery of biosolids from their source to the land application site or a facility to further process the biosolids for marketing. Also describe record retention for vouchers.

No vouchers are needed as there is no transfer. A record will be kept by the operator of the volumes sent to the fields and applied to which field.

Field Operations

- 14. Field operations do not involve storage...
- 15. For field operations involving the land application of biosolids, provide a detailed description for each of the following:
 - a. The biosolids spreader vehicles and the specifications of each vehicle.
 - A common manure spreader will be used. It has not yet been purchased
 - b. Procedures for calibrating each spreader based on the solids content of various biosolids to ensure uniform distribution and appropriate loading rates on a day-to-day basis.
 - The operator will follow the manufacturer's recommendations for calibration and the revised nutrient Management plan to set distribution rates.
 - c. Procedures used to ensure that operations address the following constraints:
 - (1) Application of biosolids to frozen ground, pasture/hay fields, crops for direct human consumption and saturated or ice/snow covered ground; and
 - (2) Maintenance buffer zones, slopes, prohibited access for beef and dairy animals, soil pH requirements, and proper site specific biosolids loading rates on a field-by-field basis.

The operators will be trained and overseen by the County Government to observe such

precautions.

Land Application Sites

Application Site Information

16. Provide a general location map for each County which clearly indicates the location of all the land application sites related to this permit application within that County and proposed transport vehicle haul routes to be utilized from the biosolids source or storage unit to the sites. (See General Instructions for map requirements.)

See maps appended for site.

17. List by County and owner all of the fields, (net) acreages, and tract number related to this permit application, and the last date of biosolids application. Report the data in the following format:

FIELD DATE OF LAST COUNTY OWNER OPERATOR *TRACT NO. ACRES APPLICATION

Westmoreland Westmoreland N/A 50.4 None_

*Agricultural Stabilization and Conservation Service tract

- 18. Provide a properly completed Land Application Agreement for each land owner, Part D-VI.

 Land Owner and spreader are same entity
- 19. Provide a legible topographic map with legend of proposed land application sites to scale as needed to depict any landscape features that will require buffer zones or may limit land application. The following landscape features should be delineated. (See General Instructions for map requirements.)
 - a. Drainage ways
 - b. Rock outcrops
 - c. Sink holes
 - d. Water supply wells and springs
 - e. Monitoring wells
 - f. Property lines
 - g. Roadways
 - h. Occupied dwellings
 - i. Slopes
 - i. Wet spots
 - k. Severe erosion (NRCS designation)
 - I. Frequently flooded soils (NRCS designation)
 - m. Surface waters

On the same map, also show the acreage to be amended with biosolids together with the net acres for biosolids application computed.

See appended map.

20. Provide a USDA soil survey map, if available, of proposed sites for land application of biosolids with the field boundaries clearly marked.

See appended Map

- 21. For each field that will receive biosolids, collect a representative soil sample for analyses of the soil parameters indicated in "Soil Test Parameters for Land Application Sites" of D-II. Results of the soil analyses must be submitted with the permit application. See appended test results.
- 22. Specify the most limiting factor regarding the rate of biosolids land application among metals loadings, nutrients (i.e., plant available nitrogen or phosphorus), calcium carbonate equivalency (applicable to lime stabilized biosolids), or other. Based on the most limiting factor, provide pertinent calculations justifying the land area requirements for land application of biosolids. Include in these calculations an annual biosolids balance incorporating such factors as precipitation, evapotransporation, soil percolation rates, wastewater loading, monthly storage (input and drawdown).

This information will be provided in the revised NMP.

- 23. Provide a nutrient management plan (NMP) prepared by a person certified as a nutrient management planner by the Department of Conservation and Recreation (DCR) for all application sites to receive biosolids. NMPs shall account for all sources of nutrients to be applied to the site and include at a minimum the following information:
 - a. Site map indicating the location of any waste storage facilities and the fields where biosolids or animal waste will be applied;
 - b. Site evaluation and assessment of soil types and potential productivities;
 - c. Nutrient management sampling including soil monitoring;
 - Biosolids or animal waste application rates based on the overall nutrient requirements
 of the proposed crop and soil monitoring results; and
 - e. Biosolids and other nutrient source application schedules and land area requirements

Note: An entire site may not receive biosolids due to buffered areas of the site identified in item 19 above. The NMP may specify the application of nutrients from sources other than biosolids within these buffered areas at the same site to achieve uniform crop production throughout the site.

The Existing NMP will be revised as required

24. Provide:

- Evidence, such as a transmittal letter, indicating that a copy of each NMP was provided to the farmer/operator of the site, the DCR Regional Watershed Office and the chief executive officer or designee for the local government; or
- b. A copy of a written request to the applicant from the farmer/operator of the site, the DCR Regional Watershed Office and the chief executive officer or designee for the local government, not to receive the NMP.

This evidence will be provided with the revised NMP.

25. A NMP approved by DCR shall be required for application sites prior to Board authorization under specific conditions, including but not limited to, sites operated by an owner or lessee of

a confined animal feeding operation, as defined in subsection A of § 62.1-44.17.1, or confined poultry feeding operation, as defined in subsection A of § 62.1-44.17.1.1; sites where land application more frequently than once every three years at greater than 50 percent of the annual agronomic rate is proposed, and other sites based on site-specific conditions that increase the risk that land application may adversely impact state waters. For each site required to have a NMP approved by DCR as described above, provide a copy of the letter of approval of the NMP from DCR.

The NMP will be so conducted.

Frequent Application Site Information

Not Applicable

SOIL TEST PARAMETERS FOR LAND APPLICATION SITES⁽¹⁾

	BIO	SOLIDS APPLICAT	ION	STORAGE
Parameter	Infrequent ⁽²⁾	Frequent Below Agronomic Rates ⁽²⁾	Frequent at Agronomic ^{(2) (3)}	Supernatant ⁽⁴⁾
Soil Organic Matter (%)	3.4		*	*
Soil pH (Std. Units)	*5/4	*	*	*
Cation Exchange Capacity (me/100g)	65		*	
Total Nitrogen (ppm)	1060		*	*
Organic Nitrogen (ppm)	1055		*	*
Ammonia Nitrogen (ppm)	4.8		*	
Available Phosphorus (ppm)	*32	*	*	*
Exchangeable Potassium (ppm)	*87	*	*	
Exchangeable Sodium (mg/100g)	71		*	*
Exchangeable Calcium (mg/100g)	822		*	*
Exchangeable Magnesium (mg/100g)	*173		*	*
Copper (ppm)	1.95		*	*
Nickel (ppm)			*	*
Zinc (ppm)	1.83		*	*
Cadmium (ppm)			*	*
Lead (ppm)			*	*
Manganese (ppm)	214		*	
Molybdenum (ppm)			*	
Selenium (ppm)			*	
Particle Size Analysis or USDA Textural Estimate (%)		:	*	*
Hydraulic Conductivity (in/hr)	See App. P			*

Note: Unless otherwise stated, analyses shall be reported on a dry weight basis(*). See 9 VAC 25-32-500.B.3.

Testing requirements to be adjusted in accordance with prior analytical test results. Heavy metal analyses are not required but once every three years before application. Liquid biosolids derived from biosolids use facilities.

VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION FORM D MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-III EFFLUENT CHARACTERIZATION FORM

1.	Facility Name:	Coles Point Wastewater Treatment System	
2.	Source of Generator:	Coles Point Wastewater Treatment System	
3.	Type of treatment:	Sequenced Batch Reactor (SBR)	
4.	Degree of Treatment:	Secondary Treatment with Chlorination Disinfection	
5.	Provide at least one analysis for each parameter listed under effluent. Upon review,		

Parameter	Effluent	
BOD	6.6	mg/l
TSS	4.4	mg/l
TRC		
Percent Solids		%
pH	<u>s</u>	<u>s.U.</u>
Nitrogen (Nitrate)	22.87	mg/l
Nitrogen (Ammonia)	0.29	mg/l
Nitrogen (Total Kjeldahl)	0.4	mg/l
Phosphorus (Total)	4.82	mg/l
Potassium (Total)	34.6	mg/l
Sodium	134	mg/l

6. Provide at least one analysis of any other pollutants which you believe may be present in the effluent. Upon Review, additional analyses may be required by DEQ.

Parameter	Effluent
Lead	mg/l
Cadmium	mg/l
Copper	<0.02 mg/l
Nickel	mg/l
Zinc	
Other	mg/l

D-IV.1

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

Coles Point Wastewater Treatment System

PART D-IV BIOSOLIDS CHARACTERIZATION FORM

1. Facility Name:

2. Source or Generator:

2.	Source or Generator:	Treatment Plant			
3.	Type of Treatment:	Biosolids treated in aerated digester then filtered			
4.	Biosolids Treatment Classification: B_				
5.		e treatment or stabilization for each ter treatment plant's residual treatme the design flow of each facility.			
Bic	osolids treated in aerated dig Production approximately 20	ester then filtered. Process show tons per year.	wn on appended drawing.		
6.		et one analysis for each parameter. To olids samples collected at the frequency.			
	Parameter	Biosolids ⁽¹⁾			
	Percent Solids	53	%		
	Volatile Solids	Unknown_			
	рН	Unknown	S.U.		
	Alkalinity as CaCO ₃ ⁽²⁾	Unknown	mg/kg		
	Nitrogen, (Nitrate)	unknown	mg/kg		
	Nitrogen, (Ammonium)	unknown	mg/kg		
	Nitrogen, (Total Kjeldahl)	5.49 (db)	mg/kg		
	Phosphorus, (Total)	1.59 (db)	mg/kg		
	Potassium, (Total)	0.38(db)	mg/kg		
	Lead	<0.05	mg/kg		
	Cadmium	<0.10	mg/kg		
	Copper	unknown	mg/kg		
	Nickel	unknown	mg/kg		
	Zinc	unknown	mg/kg		
	Arsenic	<00.05	mg/kg		
	Mercury	<0.002	mg/kg		
	Molybdenum	unknown	mg/kg		

Selenium	<0.05	mg/kg
 Values reported on a dry weight basis Lime treated biosolids (10% or more percent CaCO₃. 		ht) should be analyzed for
 For Exceptional Quality Biosolids, provide at laboratory analytical data must be represe frequencies specified in the table below. See appended test reports. 	t least one analysis ntative of biosolids	for each parameter. The samples collected at the
Parameter	Biosolids ⁽¹⁾	
Aldrin/dieldrin (total)	BQL	_ mg/kg
Benzo (a) pyrene	BQL	mg/kg
Chlordane	BQL	mg/kg
DDT/DDE/DDD (total) ⁽²⁾	BQL	_ mg/kg
Dimethyl nitrosamine	BQL	mg/kg
Heptachlor	BQL	_ mg/kg
Hexachlorobenzene	BQL	_ mg/kg
Hexachlorobutadiene	BQL	mg/kg
Lindane	BQL	mg/kg
Toxaphene	BQL	mg/kg
Trichloroethylene	BQL	mg/kg
Values reported on a dry weight basis Note: DDT = 2,2Bis (chlorophenyl) (chlorophenyl)2,2Dichloroethane; Dichloroethane 8. Provide at least one analysis of any other poll	1,1,1—Trichloroetha DDD = 1,1Bis (chl	orophenyl)2,2
biosolids. Upon review, additional analyses ma	y be required by DE	Q.
and TPH are below QL_		s, voiaules, semi-voiaules
Biosolids Sampl	ing Frequency	

_unknown_____ mg/kg

Polychlorinated biphenols

Amount of biosolids ⁽¹⁾ (metric tons per 365-day period)	Frequency
Greater than zero but less than 290	Once per year
Equal to or greater than 290 but less than 1,500	Once per quarter (four times per year)
Equal to or greater than 1,500 but less than 15,000	Once per 60 days (six times per year)

Equal to or greater than 15,000	Per month (12 times per year)
---------------------------------	-------------------------------

(1) Either the amount of bulk biosolids applied to the land or the amount of biosolids received by a person who prepares biosolids that is sold or given away in a bag or other container for application to the land (dry weight basis).

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

Treatment Plant

Coles Point Wastewater Treatment System

Biosolids treated in aerated digester then filtered

PART D-IV BIOSOLIDS CHARACTERIZATION FORM

1. Facility Name:

Source or Generator:

Type of Treatment:

4. Biosolids Treatment Classification:	В	
 Describe the method of sludge treats flow diagram of each wastewater treat production. In addition, provide the de- 	atment plant's residual treatment	solids source. Provide a train and yearly biosolids
Biosolids treated in aerated digester Production approximately 20 tons		on appended drawing.
 For all biosolids, provide at least one a must be representative of biosolids s below. 	analysis for each parameter. The camples collected at the frequence	laboratory analytical data cies specified in the table
Parameter	Biosolids ⁽¹⁾	
Percent Solids	53%	
Volatile Solids	Unknown	%
pΗ	Unknown	S.U.
Alkalinity as CaCO ₃ ⁽²⁾	Unknown	mg/kg
Nitrogen, (Nitrate)	unknown	mg/kg
Nitrogen, (Ammonium)	unknown	mg/kg
Nitrogen, (Total Kjeldahl)	5.49 (db)	mg/kg
Phosphorus, (Total)	1.59 (db)	mg/kg
Potassium, (Total)	0.38(db)	mg/kg
Lead	<0.05	mg/kg
Cadmium	<0.10	mg/kg
Copper	unknown	mg/kg
Nickel	unknown	mg/kg
Zinc	unknown	mg/kg
Arsenic	<00.05	mg/kg
Mercury	<0.002	_ mg/kg
Molybdenum	unknown	mg/kg

Polychlorinated biphenols	unknown	mg/kg
Selenium	<0.05	mg/kg
 Values reported on a dry weight basis Lime treated biosolids (10% or more percent CaCO₃. 	unless indicated. Ilime by dry weigh	nt) should be analyzed for
 For Exceptional Quality Biosolids, provide at laboratory analytical data must be represer frequencies specified in the table below. See appended test reports. Parameter 	least one analysis ntative of biosolids Biosolids ⁽¹⁾	for each parameter. The samples collected at the
Aldrin/dieldrin (total)	BQL	_ mg/kg
Benzo (a) pyrene	BQL	_ mg/kg
Chlordane	BQL	_ mg/kg
DDT/DDE/DDD (total) ⁽²⁾	BQL	_ mg/kg
Dimethyl nitrosamine	BQL	_ mg/kg
Heptachlor	BQL	_ mg/kg
Hexachlorobenzene	BQL	_ mg/kg
Hexachlorobutadiene	BQL	_ mg/kg
Lindane	BQL	_ mg/kg
Toxaphene	BQL	_ mg/kg
Trichloroethylene	BQL	_ mg/kg
Values reported on a dry weight basis Note: DDT = 2,2Bis (chlorophenyl)1 (chlorophenyl)2,2Dichloroethane; E	,1,1—Trichloroethal DDD = 1,1Bis (chlo	prophenyl)2,2
Provide at least one analysis of any other pollubiosolids. Upon review, additional analyses may	itants which you beld to be required by DEC	lieve may be present in the 2.
Note that all TCLP metals, Chlorinated per and TPH are below QL_	sticides, herbicides	s, volatiles, semi-volatiles
Biosolids Sampli	ng Frequency	
A (-51:		

Polychlorinated biphenols

Amount of biosolids ⁽¹⁾ (metric tons per 365-day period)	Frequency
Greater than zero but less than 290	Once per year
Equal to or greater than 290 but less than 1,500	Once per quarter (four times per year)
Equal to or greater than 1,500 but less than 15,000	Once per 60 days (six times per year)

Equal to or greater than 15,000 Per month (12 times per year)

(1) Either the amount of bulk biosolids applied to the land or the amount of biosolids received by a person who prepares biosolids that is sold or given away in a bag or other container for application to the land (dry weight basis).

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-V NON-HAZARDOUS WASTE DECLARATION

For waste to be land applied, the owner, as defined by 9 VAC 25-32, must sign the following statement.

I certify that the waste described in this application is non-hazardous and not regulated under the Resource Conservation and Recovery Act or the Virginia Hazardous Waste Management Regulation (9 VAC·20-60).

(Signature of Owner)

A Service Area Maps

LEGEND

PROPOSED LINES

FIGURE 7
PROPOSED SYSTEM LAYOUT
PROJECT AREA
CABIN POINT AREA
WESTMORELAND COUNTY, VIRGINIA

NOTE: ALL LOCATIONS ARE APPROXIMATE



Engineers • scientists • surveyors • planners

P.O. BOX 6160 • 9560 KINGS CHARTER DRIVE • ASHLAND, VA 23005 (804) 650-9200 • FAX (804) 550-9259

:4.64 Cabin Point\Cabin Point Report Figures_March_2013.dwg Plotted: Mar 05, 2013—11:29am

B Nutrient Management Plan

NUTRIENT MANAGEMENT PLAN IDENTIFICATION

Operator Norm Risavi PO Box 1000 Montross, VA 22520 8044930130

Integrator:None

Farm Coordinates
Easting: 0, Northing: 0, zone: 17

Watershed Summary watershed: PL70 county: Westmoreland

Nutrient Management Planner
Jeff Michel
PO Box 71
Warrenton VA. 20186

Certification Code: 499

Acreage Use Summary
Total Acreage in this plan: 50.4
Cropland: 0.
Hayland: 0.
Pasture: 0.
Specialty: 50.4

Livestock Summary

Beef Cattle 0
Dairy Cattle 0
Poultry 0
Swine 0
Other 0

Manure Production Ralance

		manure Frou	ucuon balance		
	Imported	Produced	Exported	Used	Net
kgals	0.	0.	0.	n	0
tons	0.	0.	0.	0.	0.

Plan written 11/1/2012 Valid until 11/1/2015

Signature Michel

date



COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street

Richmond, Virginia 23219-2010
(804) 786-1712

11/08/2012

Jeff Michel M&M Consulting, Inc. P.O. Box 71 Warrenton, VA 20188

RE: Nutrient management plan revision submission: 10/15/2012

Dear Mr. Michel:

Your revised nutrient management plan for Coles Point Wastewater Treatment Plant, operated by Norm Risavi, located in Westmoreland County in watershed PL70 has been approved by the Virginia Department of Conservation & Recreation. This site consists of a 50.4 acre agricultural field that is divided into 6 sub-fields of approximately 8.4 acres each and will receive the effluent by means of irrigation that is generated at the Coles Point Wastewater Treatment Plant.

This site has been site inspected by DCR in conjunction with representatives from DEQ and Westmoreland County. Any revisions made to this NMP must be approved by DCR. Please note that this letter should be kept with the nutrient management plan and this plan expires on 11/01/2015. Feel free to contact me should you have any questions concerning this letter.

Sincerely,

Rachel Barnes McAden

Environmental Specialist - Biosolids

MR Bomes Held

Division of Stormwater Management

(804) 371-2762

rachel.mcaden@dcr.virginia.gov

cc: DEQ -Piedmont Regional Office, Westmoreland County Administrator

Nutrient Management Plan Balance Sheet (Spring, 2012-Fall, 2015) Coles Point Planner: Jeff Michel (cert. No. 499)

Tract: Route 612 Eastern Tract Location: Westmoreland (N = N based, 1P = P based, 1.5P = P based at 1.5 removal, 0P = No P allowed)

Field CFSA No.	Size (ac)	<u> </u>	Crop Need N-P-I	Needs	Leg /Man	Manure/Biosid Rate & Type	ā =	Man/Bios N-P-K	Net = Needs -	Sum	Commercial N-P-K	Notes
Name	Totall			(lbs/ac)	Resid	(season)		(lbs/ac)	(lbs/ac)	rem	(lbs/ac)	
	Used									cred		
0/1A(N)	8/8	2012	Mixed Grass Hay	60-60-120	0/0	496.k Efflue(Su)	>7	36-39-141	25-20-(20)	N/A		-
		2013		60-60-120	92	496.k Efflue(Su)	>7	36-39-141	20-40-(40)	N N		
		2014	:	60-60-120	0/4	496.k Efflue(Su)	>7	36-39-141	20-60-(60)	Š		
		2015		60-60-120	0/5	496.k Efflue(Su)	>7	36-39-141	20-80-(80)	Z S		
0/1B(N)	8/8	2012	Mixed Grass Hay	60-60-120	0/0	496.k Efflue(Su)	>7	36-39-141	25-20-(20)	N/A		
		2013		60-60-120	0/2	496.k Efflue(Su)	×7	36-39-141	20-40-(40)	NA		
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		2014		60-60-120	0/4	496.k Efflue(Su)	×	36-39-141	20-60-(60)	N N		
		2015		60-60-120	0/5	496.k Efflue(Su)	>7	36-39-141	20-80-(80)	N A		
0/2A(N)	8/8	2012	Mixed Grass Hay	60-60-120	0/0	496,k Efflue(Su)	>7	36-39-141	25-20-(20)	NA		
		2013	***	60-60-120	92	496.k Efflue(Su)	>7	36-39-141	20-40-(40)	N/A		
		2014		60-60-120	0/4	496.k Efflue(Su)	>7	36-39-141	20-60-(60)	N N		
AND THE PROPERTY OF THE PROPER		2015	Sire have are	60-60-120	0/5	496.k Efflue(Su)	>7	36-39-141	20-80-(80)	N/A		
0/2B(N)	8/8	2012	Mixed Grass Hay	60-60-120	0/0	496.k Efflue(Su)	>7	36-39-141	25-20-(20)	A/N		
	Wants	2013		60-60-120	0/2	496.k Efflue(Su)	×7	36-39-141	20-40-(40)	N/A		
	ucum)	2014	::	60-60-120	0/4	496.k Efflue(Su)	>7	36-39-141	20-60-(60)	Š		
		2015	***	60-60-120	0/5	496.k Efflue(Su)	>7	36-39-141	20-80-(80)	NA		
0/3A(N)	8/8	2012	Mixed Grass Hay	60-60-120	0/0	496.k Efflue(Su)	>7	36-39-141	25-20-(20)	NA		
W DOLLAR	*******	2013		60-60-120	0/2	496.k Efflue(Su)	>7	36-39-141	20-40-(40)	N N		•
	*********	2014	****	60-60-120	0/4	496.k Efflue(Su)	7	36-39-141	20-60-(60)	N N		
		2015	*** ***	60-60-120	0/5	496.k Efflue(Su)	>7	36-39-141	20-80-(80)	Z/A		-
0/3B(N)	8/8	2012	Mixed Grass Hay	60-60-120	0/0	496.k Efflue(Su)	>7	36-39-141	25-20-(20)	N/A		
******	*********	2013		60-60-120	0/2	496.k Efflue(Su)	>7	36-39-141	20-40-(40)	Z		
		2014	***	60-60-120	0/4	496.k Efflue(Su)	×7	36-39-141	20-60-(60)	N N		
MICHAEL STATE		2015	****	60-60-120	0/5	496.k Efflue(Su)	>7	36-39-141	20-80-(80)	Z		

Commercial Application Methods: br - Broadcast ba - Banded sd - Sidedress

Coles Point Narrative

NARRATIVE:

Description of use:

This Nutrient Management Plan is an update of a previously approved plan dated June 20 2012 for the Coles Point Wastewater Treatment Pant in Westmoreland County Virginia. The site involved with this plan is an agricultural field located at 38.10357/76.62715 on the southeastern side of State Route 612. This plan was prepared by M&M Consulting Inc. with the assistance of a previous plan prepared by Draper Aden Associates and Resource International Ltd.

The objective of the plan is four-fold.

- 1. The primary objective of the plan is to insure that the soils located within the wastewater disposal area maintain their ability to absorb water.
- 2. To maintain a stand of mixed grasses which include Reed Canarygrass, Tall Fescue, Bermudagrass, and Broomsedge that has the ability to absorb and utilize the fertility inherent to the treated effluent water being processed by the wastewater plant.
- 3. To mow, harvest, or otherwise utilize and maintain this mixed stand of grasses to allow for the effcient use of opportunities to irrigate the wastewater on the site and protect the viability of the grass stand. Currently the amount of nutrients supplied by the wastewater underfertilize the mixed grass stand as suggested in the VT agronomic and turfgrass guidelines. This is acceptable in our situation since our objective is to maintain a stand of grass to absorb the wastewater and it's nutrients not produce a marketable grass export from the site. We will use the organic matter threshold of 7% to determine the need to remove generated tissue. Readings less than 7% will allow us to recycle clippings into the fields. Readings above 7% will allow us to consider removing clippings from the fields.
- 4. To secure a waiver for the 2" per week irrigation restriction to allow the plant operators to irrigate based on tensiometer readings and visual plant and soil observations.

This NMP deals with the listed objectives in the following manner.

1. The data provided by frequent soil and water testing will be utilized to determine a course of action to maintain the viability of the soil. Input recommendations will not be based solely on pH or crop requirements but the ratios and relationships of metals in the soil and water. Calcium containing products, such as limestone and gypsum, will be important tools in modifying and maintaining cation ratios in the soil.

This cation imbalance plan will utilize testing that is currently in place to maintain a calcium ratio of 60-70%, a magnesium ratio of 10-20%, and Potassium ratio of 2-8%, and a sodium ratio of under 6% with hydrogen making up the balance of the cations.

2. Our fertility inputs to maintain a stand of mixed grasses will primarily come from the water. If the water cannot support a viable stand of grasses based on our mowing, haying, and visual observation and analysis, additional fertility will be applied to improve the stand. Some of the shortfalls of fertility can be made up by mowing and the recycling of clippings into the stand. If commercial fertility is required, the inputs will be based on observation, combined with soil and water testing data. Broadleaf and non selective weed control should be a intergal part of the mixed grass stand maintenance program.

According to the data provided by the WWTP, the total input flow for 2011 was 9696640 gallons which equates to a daily flow rate of 26566 gallons. This is significantly below the anticipated daily flow rate of 75000 gallons. For the purpose of the plan we are going to deal with an anticipated flow of 25,000,000 gallons. This will allow for the development of a plan that takes into account planned expansions of the system within the NMP and DEQ permit timelines. A quarterly review of the flow rates and application events will allow for the adjustment of inputs to the fields and the mixed grass stand.

The irrigation areas consist of approximately 50.4 acres that is divided equally into 6 sub-fields of approximately 8.4 acres. The sub-fields are labeled 1-A, 1-B,2-A,2-B,3-A,3-B.

The existing crop is a mixture of Reed Canarygrass hybrid Palaton, Tall Fescue, Common Bermudagrass, and Broomsedge. All fields have an acceptable level are ground coverage. If a thinning of the stand occurs, either Reed Canarygrass or Mowark Forage Bermudagrass will be interseeded into the stand to improve density. The primary objective is to maintain a stand of grasses that will utilize and absorb the small quantity of nutrients found in the effluent water. New tools have become available recently to measure the moisture content of the soil. Westmoreland County has purchased the portable FieldScout TDR 300 Soil Moisture Meter to sample more data points in the fields than the existing tensiometers and is the current tool used to collect data for the determination of irrigating opportunities. Improvement in irrigation cycles during periods of stress will improve and help maintain the mixed grass stand.

Soil Types

Three soil types occur in the application area; Bertie, State fine sandy loam, and Tetotum loam. All soils listed are classified as Productivity Group I for grass hay. Please note that the area mapped as Bertie soil in the NMP is mapped as Lumbee soil in the Soil Survey of Westmoreland County; however the NRCS determined the area to be a Bertie Soil in a letter dated June 13, 2003 from John Nicholson, Soil Resources Specialist.

I substituted the State soil in the place of the Bertie soil since the Bertie soil is not listing in the Nut-Man program. Both soils are Productivity Group I for grass hay.

Effluent Water Nutrient Calculations

2011 Average CPWWTP Water Sample Results:

NO3- 6.50 ppm

NH4+ 2.16 ppm

TKN 3.31 ppm

Total P 4.14 ppm

Potassium 28.2 ppm

Sodium 163.83 ppm

Nitrogen

NO3- + (NH4 x.5) + (TKN-NH4) = PAN

6.5ppm NO3- $+(2.16ppm NH4 \times .5) + (3.31ppmTKN-2.16)$

= 8.73ppm Plant Available Nitrogen

8.73ppm PAN= .000072772 # PAN/gallon H2O.

.000072772# PAN/gal x 25000000 gallons effluent = 1819.3# PAN

1819.3# PAN / 50.4 acres = 36.1# PAN/acre

36.1# PAN/acre

Phosphorus (P2O5)

4.14ppm P =.000034511 # P/gallon effluent

.000034511#P x 25000000 gallons effluent = 862.8 # P

862.8#P / 50.4 acres = 17.2 #P/acre

17.2#P/acre x 2.29# P2O5/P = 39.4# P2O5/acre

39.4# P2O5/acre

Potassium (K2O)

28.20 ppm K = .000235072# K/gallon effluent

.000235072# K x 25000000 gallons effluent = 5876.8# K

5876.8# K / 50.4 acres = 116.6# K

116.6# K x 1.2# K2O/K = 140.0# K2O/acre

140.0# K2O/acre

Sodium (Na)

163.83 ppm Na = .001365668# Na/gallon effluent

.001365668# Na x 25000000 gallons effluent = 34141.7# Na

34141.7# Na / 50.4 acres = 677.4# Na/acre

677.4# Na/acre

ACTION PLAN:

Apply high calcium limestone to fields 1A,1B, 2A, 2B in the spring of 2013.

The fertility applications to the fields will be applied via the effulent water. The NutMan plan does not have a tab for this contingency, therefore the nutrient application is treated as a commercial broadcast application within this plan.

Interseed any poor grass coverage areas in the fields with either Reed Canarygrass or Mohawk Bermudagrass. Necessity of interseeding will be determined by quarterly site review by CPWWTP employees.

This project began with the assumption that there would be a tremendous amount of nutrients in the wastewater stream and that there would be a significant daily volume of water to dispose of. Both assumptions have been proven to be overstated. The amount of nutrition, especially nitrogen and phosphorus, has been shown to be far lower than expected. The total water volume at the plant is also about 1/3 of what was projected. Therefore it is in the interest of all parties and of the environment to begin shifting toward a mowing management activity as opposed to a hay production activity. Essentially, there are barely enough nutrients to maintain our mixed grass stand and therefore very little nutrients in need of export. By mowing at a height of 4-6" we can help manage broadleaf weeds and undesirable woody vegetation while recycling a small amount of nutrition back into our system. Mowing would also allow for a more effective irrigation schedule to apply water during permitted times and plant needs. If the organic matter in the soil exceeds 7%, we will consider the exportation of the grasses produced on the site.

CPWWTP will retest the soils annually and adjust the calcium and magnesium inputs accordingly.

Water Balance Sheet

2011 Inflow = 9696640 gallons. It is the objective of the wastewater management to apply all of the effluent produced in a given year during the time of permitted application. This is the latest volume for 2011 treated and stored by the plant.

9696640 gallons /27145 gallons per acre inch = 357.22 acre inches.

357.22 acre inches/ 50.4 acres = 7.09 inches per acre.

7.09 inches per acre x 27145 gallons per acre inch = 192458 gallons per acre.

192458 gallons x .000090694#N per gallon = 17.45#N/acre.

Proposed inflow = 25000000.

25000000 gallons / 27145 gallons per acre inch = 921 acre inches

921 acre inches / 50.4 acres = 18.3 inches per acre.

18.3 inches per acre x 27145 gallons per acre inch = 496754 gallons per acre.

Soil Test Summary

Tract	Field	Acre	Date	P205	K20	Lab	Soil	Lime	rec. lime
							PH		tons/Ac
Route 612	À	ထ	2011-Sp	2011-Sp M+ (192 P2O5	H+ (400 K lbs/acre)	Brookside	5.9	꽁	ن ــــ
Eastern Tract				lbs/acre)					
Route 612	ਲੇ	ထ	2011-Sp	2011-Sp M- (92 P2O5	M+ (212 K lbs/acre)	Brookside	5.7	2013Sp 1.	\
Eastern Tract				lbs/acre)				-	
Route 612	2A	တ	2011-Sp	2011-Sp M+ (188 P205	M+ (244 K lbs/acre)	Brookside	<u>ග</u>	2013Sp	
Eastern Tract				lbs/acre)					
Route 612	2B	00	2011-Sp	2011-Sp M+ (202 P2O5	H (328 K lbs/acre)	Brookside	တ ယ	2013Sp 1.	ن ــــ
Eastern Tract			,	lbs/acre)					
Route 612	3A	ထ	2011-Sp	2011-Sp M (165 P2O5	H (296 K lbs/acre)	Brookside	ნ.5		
Eastern Tract				lbs/acre)					
Route 612	3B	ထ	2011-Sp	2011-Sp M (179 P2O5	H- (288 K lbs/acre)	Brookside	တ (သ		
Eastern Tract				lhs/acre)					

Manure Production Summary

Manure Name: NewManure2

Animal Summary

Manure Storage Capacity: 0. tons

Manure Analysis: TKN: 3.31 P2O5: 4.14 NH4: 2.16 K2O: 28.2

Plant Available Nutrients: Immediate Incorporation:

1.94 lbs N

Surface Applied: 4.14 lbs P2O5 28.20 lbs K2O

1.08 lbs N 4.14 lbs P2O5 28.20 lbs K2O

Residual N: yr 1: .14 lbs yr 2: .06 lbs yr 3: .02 lbs

Mar-May Jun-Aug Sep-Nov

Manure Production
Dec-Feb

Total Produced: 0
Manure Sold/yr: 0
Manure purch./yr:

0

Biosolid Name: Effluent
Availability: unlimited
Biosolid Type: Aerobic Digestion
% solid: 24.0
pH: 6.2
%CCE: 0.0 Biosolid Analysis (ppm): TKN: 32 NH4-N: 12 NO3: 24 P2O5: 38.93 K2O: 141.6

Plant Available Nutrients: Immediate Incorporation: 0.08 lbs N

Residual N: yr1: 0.0 lbs N yr2: 0.0 lbs N yr3: 0.0 lbs N

Surface Applied: 0.07 lbs N 0.08 lbs P2O5 0.28 lbs K2O

0.08 lbs P2O5 0.28 lbs K2O

Field Productivities for Major Crops

1A* 8 Lumbee V 1B* 8 Lumbee V 2A* 8 Lumbee V 2B 8 Tetotum IIIa 3A 8 Tetotum IIb 3B 8 Tetotum Ib	Tract Name	Fed	Field Name	Acres	Predominant Soil Series	Com	Small	Alfalfa	Grass	Environmental Warnings
0/0 1B* 8 Lumbee V V Not Not 0/0 2A* 8 Lumbee V V Not Not 0/0 2B 8 Tetotum IIIa I III I 0/0 3A 8 Tetotum IIb I III I 0/0 3B 8 Tetotum Ib I III I	Route 612	0/0	1	ය	Lumbee	<	<	Not	Not	Poor Drainage
1B* 8 Lumbee V V Not Not Not 2A* 8 Lumbee V V Not Not Not 2B 8 Tetotum IIIa I III I III I 3A 8 Tetotum IIb I III I III I 3B 8 Tetotum Ib I III I III I	a m							Suited	Suited	ŧ
2A* 8 Lumbee V V Not Not 2B 8 Tetotum Illa I III I 3A 8 Tetotum Ilb I III I 3B 8 Tetotum Ib I III I		0/0	효	00	Lumbee	<	<	Not Not	Not	Poor Drainage
2A* 8 Lumbee V V Not Not 2B 8 Tetotum IIIa I III I 3A 8 Tetotum IIb I III I 3B 8 Tetotum Ib I III I					w			Suited	Suited	į
2B 8 Tetotum IIIa I III I 3A 8 Tetotum IIb I III I 3B 8 Tetotum Ib I II I		0/0	2A*	8	Lumbee	<	<	Not	No.	Poor Drainage
2B 8 Tetotum IIIa I 3A 8 Tetotum IIb I 3B 8 Tetotum Ib I								Suited	Suited	
3A 8 Tetotum 3B 8 Tetotum		0/0	28	ထ	Tetotum	<u>≡</u>			******	
3B 8 Tetotum		0/0	3A	00	Tetotum	₹		teraria elizabili encerni	********	
	•	0/0	3B	œ	Tetotum	ਰ		===		

^{*} Do not apply manure or biosolids more than 30 days prior to planting. Apply commercial fertilizer nitrogen to row crops in split spring applications.

Yield Range

Field Productivity Group	Corn Grain Bu/Acre	Barley/Intensive Wheat Bu/Acre	Std. Wheat Bu/Acre	Alfalfa Tons/Acre	Grass/Hay Tons/Acre
	>170	>80	X64	တို	×4,0
Church-	150-170	70-80	56-64	4-6	3.5
Accessed to the control of the contr	130-150	60-70	48-56	4	3.0
<	100-130	50-60	40-48	2	<3.0
<	<100	<50	<40	5	Z

Manure Spreading Summary

20126	102107						Season	2013CH	201000						Propries and in the contract of the contract o	Season	201450							Season	2015Su					
Manure	Effluent							manure	THE STATE OF THE S						THE STATE OF THE S	Manure	Effluent							Manure	Effluent					
Rate/ac	496.0 kgals	496.0 Kgais	490.0 Kgals	496 O kgala	496 O kgala	TOOLO NGOIS		Rate/ac	496.0 kgals	496.0 kgals	496.0 kgals	496.0 kgals	496.0 kgals	496.0 Kgais		Rate/ac	496.0 kgals		Rate/ac	496.0 kgals	496.0 kgals	496.0 kgals	496.0 kgals	496.0 kgals	496.0 kgals					
Tract	Route 612	Route 612	Route 612	Notice of A	Route 612	Nonte 912		Tract	Route 612	Route 612	Route 612	Route 612	Route 612	Route 612		Tract	Route 612		Tract	Route 612	Route 612	Route 612	Route 612	Route 612	Route 612					
Field	1A	₩	2A	2 15	3 A	Š		Field	₹	荿	2A	2B	3A	3B		Field	ĵ,	18	2A	2B	3A	3B	:	Field	1A	Ď,	2 6	2 !	3A	3B
Acres	8	œ	00	- Φ	00	œ		Acres	တ	CO (50 4)	Co s	ထ		Acres	8	œ	œ	ထ	တ	တ	•	Acres	× os	e c	0 0	0 0	O C	ထ
Crop	Mixed Grass Hay		Crop	Mixed Grass Hav	Mixed Grass Hay	Mixed Crass Hay	Mixed Grass Hay	Mixed Grass Hay	Mixed Grass Hay		Cron	Mixed Grass Hav	Mixed Grass Hay				Wilked Grass Hay	Wilxed Grass Hay	Mixeu Glass Hay	Mixed Grass Hay	Mixed Grass Hay									
Total in Field	4166 kgals	4166 knals	4166 kgals	4166 kgals	4166 kgals	4166 kgals		Total in Flaid	A188 kanle	4166 kgals	4 loo kgals	4 loo kgais	A166 kgale	4166 kgals		Total in Tiols	A 188 kaple	A188 knale	A166 kople	A166 knale	4166 kgsls	4166 kgals	4 loo kyais		l otal in Field	4166 kgals	4166 kgals	4 Too Kgais	4166 kgals	4166 kgals
	2	8333 kgala	12499 knals	16666 kgals	20832 kgals	24998 kgals			A166 basis	4 lob kgais	8333 Kgals	12499 kgals	Tobbo Kgais	24998 kgals		Dissipation	A166 koris	A TOO NOOLS	13400 kask	16666 Facto	SIEDN GOOD	2/1008 kgals	24998 Kgals		Running Total	4166 kgals	8333 kgals	12499 kgals	16666 kgals	24998 kgals

Application Summary Report

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	Lime (tons)
Route 612 East	1A	8.4	496.0k Efflu(Su)				-
	1B	8.4	496.0k Efflu(Su)			**************************************	
	2A	8.4	496.0k Efflu(Su)				
	2B	8.4	496.0k Efflu(Su)				,
	3A	8,4	496.0k Efflu(Su)			***************************************	***************************************
	သူ	α 4	498 OK Effin(Sin)				

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	(tons)
Route 612 East	1A	8.4	496.0k Efflu(Su)				1.0 (Sp)
	1B	8.4	496,0k Efflu(Su)				1.0 (Sp)
***************************************	2A	8.4	496.0k Efflu(Su)				1.0 (Sp)
***************************************	28	8.4	496.0k Efflu(Su)		***************************************		1.0 (Sp)
	3A	8.4	496.0k Efflu(Su)			***************************************	
)]	*	500.75		***************************************	***************************************	

Tract	Field	Acres	Manure Data and Two	Broadcast	Banded	Topdress	Lime
			Rate and Type (Season)	Commercial	Commercial	Commercial	(tons)
Route 612 East	1A	8.4	496.0k Efflu(Su)		The second secon		-
	18	8,4	496.0k Efflu(Su)		***************************************		
	2A	8.4	496.0k Efflu(Su)				
	2B	8.4	496.0k Efflu(Su)				
	3A	8,4	496.0k Efflu(Su)		e militar e i de cita de la cita		
	မ္မာ	8.4	496.0k Efflu(Su)	***************************************	***************************************	***************************************	***************************************

2015: Mixed Grass Hay

	**************************************				Route 612 East	Tract	
3B	3A	28	2A	1	1A	Field	
8.4	8.4	8.4	8.4	8.4	8.4	Ac	
						Acres Manure Rate and Type (Season)	
						Broadcast Commercial	
den e esta de la composición de la comp		APPERENT PROPERTY APPEARANCE FOR THE PROPERTY APPEARANCE F				Banded Commercial	
	***************************************		A CHARGAS LA CALABATA CANADA C			Topdress Commercial	
	**************************************					Lime (tons)	

Route 612 Eastern Tract: 1A

Phosphorus Environmental Threshold Calculation

Last soil test P ppm = 16.08592 Region = Eastern Shore and Lower Coastal Plain PET result = N-based

Route 612 Eastern Tract: 1B

Phosphorus Environmental Threshold Calculation

Last soil test P ppm = 6.00992
Region = Eastern Shore and Lower Coastal Plain
PET result = N-based

Route 612 Eastern Tract: 2A

Phosphorus Environmental Threshold Calculation

Last soil test P ppm = 15.68288
Region = Eastern Shore and Lower Coastal Plain
PET result = N-based

Route 612 Eastern Tract: 2B

Phosphorus Environmental Threshold Calculation

Last soil test P ppm = 17.09352
Region = Eastern Shore and Lower Coastal Plain
PET result = N-based

Route 612 Eastern Tract: 3A

Phosphorus Environmental Threshold Calculation

Last soil test P ppm = 13.3654
Region = Eastern Shore and Lower Coastal Plain
PET result = N-based

Route 612 Eastern Tract: 3B

Phosphorus Environmental Threshold Calculation

Last soil test P ppm = 14.77604 Region = Eastern Shore and Lower Coastal Plain PET result = N-based

C Soil Boring Logs

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/11/00

LOGGED BY: SLK

Hand Auger No. HA-1		epth ange (ft.)	Generalized Soil Description
	0	- 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3	- 0.6	Very dark grayish brown (10YR 3/2), Silt loam, trace roots (somewhat friable)
	0.6	- 2.5	Light gray (2.5Y 7/2), Silty clay loam, trace roots (damp) (mottled) (low to medium plasticity) (little fine sand and moist at 2.0 to 2.5 feet)
	2.5	- 4.0	Light brownish gray (2.5Y 6/2), Sandy loam (wet) (mottled) (trace gravel at 3.5 to 4.0 feet)
	4.0		Brownish yellow (10YR 6/8), Sandy clay loam, trace to little indurated/cemented fragments (wet to moist) (highly mottled)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 3.0 feet; caved to 4.8 feet at completion.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/11/00

LOGGED BY: SLK

Depth Range (ft.)	Generalized Soil Description
0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
0.2 - 2.0	Light brownish gray (2.5Y 6/2), Silty clay, trace roots (damp) (mottled)
2.0 - 3.0	Light brownish gray (2.5Y 6/2), Loamy sand, trace gravel (wet)
3.0 - 4.5	Light brownish gray (2.5Y 6/2), Loamy sand, trace roots (wet) (highly mottled at 4.0 to 4.5 feet)
4.5	Light yellowish brown (2.5Y 6/4), Silty clay, trace vegetative fibers, trace indurated/cemented fragments (wet) (mottled)
	Range (ft.) 0 - 0.3 0.2 - 2.0 2.0 - 3.0 3.0 - 4.5

NOTES:

(1) Auger terminated at 5.0.(2) Water level at 2.5 feet; bottom at 5.0 feet at completion.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.Q. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/11/00

LOGGED BY: SLK

Hand Auger No. HA-3	Depth Range (ft.)	Generalized Soil Description
i in-o	0 - 0.5	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.5 - 0.9	Light olive brown (2.5Y 5/4), Silt Loam, trace roots, (somewhat friable)
	0.9 - 2.0	Grayish brown (2.5Y 5/2), Silty clay, trace roots (damp) (mottled) (sticky) low to medium plasticity)
·	2.0 - 3.0	Pale yellow (2.5Y 7/4), Sandy clay loam, trace gravel (moist to wet) mottled)
	3.0 - 4.5	Olive yellow (2.5Y 6/6), Sandy clay loam, some gravel, (wet) (mottled)
	4.5	Brownish yellow (10YR 6/8), Silty clay loam (highly mottled) medium plasticity

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 3.0 feet; caved to 4.2 feet at completion.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/15/00

LOGGED BY: SLK

Hand Auger No. HA-4	Depth Range (ft.)	Generalized Soil Description
	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 1.5	Light yellowish brown (2.5Y 6/4), Silty clay, tace roots, (somewhat friable 0.2 –0.5 feet) (moist 0.5 – 1.5 feet) (mottled)
	1.5 - 2.3	Light brownish gray (2.5Y 6/2), Sandy loam, little gravel (moist) (mottled)
	2.3	Yellowish brown (10YR 5/6), Loamy sand (moist) (highly mottled)

NOTES:

- Auger refusal at 3.1 feet due to coarse gravel.
 No groundwater observed.
 No offset attempted.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/11/00

LOGGED BY: SLK

Annual Control of the		
Hand Auger No. HA-5	Depth Range (ft.)	Generalized Soil Description
пичо	0 - 0.6	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.6 - 1.2	Light olive brown (2.5Y 5/4), Silt loam, trace roots (somewhat friable)
- -	1.2 - 2.3	Light yellowish brown (2.5Y 6/4), Silty clay, trace roots (damp) (slightly mottled) (low plasticity)
	2.3 - 3.3	Light olive brown (2.5Y 5/4), Sandy loam, trace gravel (moist) (highly mottled)
	3.3 - 4.0	Light olive brown (2.5Y 5/6), Loamy sand (moist to wet) (mottled)
	4.0 - 4.5	Light olive brown (2.5Y 6/6), Loamy sand (moist to wet) (highly mottled)
	4.5	Yellowish brown (10YR 5/8), Silty clay, trace indurated/cemented fragments (mottled)

NOTES:

- (1) Auger terminated at 5.0 feet.(2) Water level at 4.2 feet; bottom at 5.0 feet at completion.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/11/00

LOGGED BY: SLK

Hand Auger No. HA-6	Depth Range (ft.)	Generalized Soil Description
па-о	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers, (damp)
	0.3 - 2.5	Dark gray (10YR 4/1), Silty clay, trace gravel, trace roots/vegetative fibers (moist) (mottled) (low plasticity) (wet 2.0 to 2.5 feet) (little gravel to fine sand at 2.0 to 2.5 feet)
	2.5 - 4.5	Light gray (10YR 7/1), Silty Clay, trace gravel, trace vegetative fibers (possible saturated) (mottled) (slight platey structure)
	4.5	Brownish yellow (10YR 6/8), Silty clay, trace gravel, trace vegetative fibers, with trace to little indurated/cemented fragments (possible saturated) (mottled) (slight platey structure)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 1.6 feet: boring at 5.0 feet at completion.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/11/00

LOGGED BY: SLK

Hand Auger No. HA-7	Depth Range (ft.)	Generalized Soil Description
	0 - 0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.1 - 1.8	Dark grayish brown (2.5Y 4/2), Silty clay loam, trace gravel, trace roots (moist) (mottled at 1.0 to 1.8 feet)
	1.8 - 2.2	Light gray (10YR 6/1), Silty clay loam, trace gravel, trace roots, with silty clay (moist) (mottled at 1.0 to 1.8)
	2.2	Very pale brown (10YR 7/4), Sandy loam, little gravel (wet) (dull mottling)
	•	*Auger refusal due to coarse gravel at 30 feet)

NOTES:

- (1) Offset 2 feet ±; encountered similar soil conditions with auger refusal at 2.7 feet due to coarse gravel.
- (2) Water level at 2.2 feet; bottom at 3.0 feet at completion.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/19/00

LOGGED BY:

SLK

Hand Auger No. HA-8	Depth Range (ft.)	Generalized Soil Description
	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 1.5	Light olive brown (2.5Y 5/4), Silty clay loam, trace roots, trace gravel, (moist) (mottled)
	1.5 - 2.5	Light brownish gray (2.5Y 6/2), Sandy clay loam, trace gravel, trace roots (moist) (mottled)
	2.5	Light gray (10YR 6/1), Loamy sand, little gravel (wet) (bright and highly mottled 4.5 – 5.0 feet)

NOTES: (1) Aug

(1) Auger terminated at 5.0 feet.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/12/00

LOGGED BY:

SLK

Hand Auger No. HA-9	Depth Range		Generalized Soil Description
112-5	0 -	0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 -	0.5	Olive brown (2.5Y 4/4), Silty clay loam, trace roots
	0.5 -	2.5	Light brownish gray (2.5Y 6/2), Silty clay loam, trace roots, (moist to wet) (mottled) sticky)
	2.5 -	4.0	Light gray (10YR 6/1), Sandy clay loam, little grave, trace roots (wet) (mottled)
	4.0 -	•••	Brownish yellow (10YR 6/6), Loamy sand, some coarse gravel (wet) (mottled)

NOTES:

- (1) Auger terminated at 5.0 feet.(2) Water level at 3.0 feet; bottom at 5.0 feet at completion.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/19/00

LOGGED BY: SLK

Hand Auger No. HA-10	Depth Range (ft.)	Generalized Soil Description
	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 2.0	Light yellowish brown (2.5Y 6/4), Silty clay, trace roots, (damp to moist) (highly mottled $1.0-2.0$ feet) (little to some fine sand $1.5-2.0$ feet) (low plasticity)
	2.0 - 3.5	Gray (10YR 5/1), Sandy loam, little gravel, trace roots, (wet) (dull mottling)
	3.5	Grayish brown (2.5Y 5/2), Loamy sand, , little gravel (wet) (dull mottling)

NOTES:

(1) Auger terminated at 5.0 feet.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/13/00

LOGGED BY: SLK

Hand Auger No. HA-11	Depth Range (ft.)	Generalized Soil Description
	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 0.7	Olive brown (2.5Y 4/4), Silt, trace roots
	0.7 - 2.5	Light brownish gray (2.5Y 6/2), Silty clay, trace gravel, trace roots (low plasticity) (mottled) (little fine to medium sand at 2.0 – 2.5 feet)
	2.5	Light grayish brown (2.5Y 6/2), Loamy sand, trace gravel (wet) (running sand $4.0-5.0$ feet \pm)

NOTES:

- (1) Auger terminated at 5.0 feet.(2) Wet and caved at 4.0 feet.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/13/00

LOGGED BY: SLK

Hand Auger No. HA-12	Depth Range (ft.)	Generalized Soil Description
	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 0.7	Dark grayish brown (10YR 4/2), Silt loam, trace gravel, trace roots
•	0.7 - 2.5	Dark grayish brown (2.5Y 4/2), Silty clay, trace gravel, trace roots (low plasticity) (dull mottling) (little to some fine sand at 2.0 – 2.5 feet)
	2.5	Grayish brown (2.5Y 5/2), Loamy sand, little gravel, (wet at 3.0 – 5.0 feet) (running sand 3.0 – 5.0 feet)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 4.0 feet; caved to 4.3 feet at completion.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/13/00

LOGGED BY: SLK

Hand Auger No. HA-13	Depth Range (ft.)	Generalized Soil Description
117-10	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 0.5	Dark grayish brown (10YR 4/2), Silty loam, trace roots
	0.5 - 2.5	Dark grayish brown (2.5Y 4/2), Silty clay loam, trace roots, trace gravel (low to medium plasticity) (dull mottled)
	2.5 - 4.5.	Dark grayish brown (2.5Y 4/2), Sandy loam, little gravel (coarse gravel at 4.0 feet) (moist to wet) (dull mottling)
	4.5	Light gray (10YR 7/1), Silty clay, trace roots (stiff) (sandy pockets/lenses) highly mottled)

NOTES:

(1) Auger terminated at 5.0 feet.

(2) Bottom at 5.0 feet; water level at 4.0 feet at completions.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/19/00

LOGGED BY: SLK

Hand Auger <u>No.</u> HA-14	Depth Range (ft.)	Generalized Soil Description
	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 1.5	Dark gray (10YR 4/1), Sandy clay loam, trace roots (wet)
	1.5 - 3.0	Gray (10YR 5/1), Sandy loam, trace coarse gravel, trace roots (wet)
	3.0	Dark Gray (10YR 4/1), sandy loam, trace to little gravel (wet) (trace recovery – sand running out of bucket)

NOTES:

- (1) Auger terminated at 3.5 feet (no recovery).(2) In wetland delineated area.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/15/00

LOGGED BY: SLK

Hand Auger No. HA-15	Depth Range (ft.)	Generalized Soil Description
	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
· .	0.2 - 1.5	Light gray (10YR 6/1), Silty clay loam, trace roots (moist) (mottled)
	1.5 - 3.5	Grayish brown (2.5Y 5/2), Sandy clay loam, trace coarse gravel, trace roots (moist to wet) (mottled) (little to some clayey silt at 3.0 to 3.5 feet)
•	3.5 - 4.5	Light yellowish brown (2.5Y 6/4), Sandy loam, trace medium to coarse gravel, trace roots (wet) (brightly colored) (mottled)
	4.5	Light gray (10YR 7/1), Loamy sand, little coarse gravel (wet to running sand)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 2.8 feet; caved at 3.5 feet at completion.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/19/00

LOGGED BY: SLK

Hand Auger No. HA-16	Depth Range (ft.)	Generalized Soil Description
ПА-10	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 2.0	Grayish brown (10YR 5/2), Silty clay loam, trace roots (slightly mottled) (moist)
	2.0 - 4.0	Light brownish gray (10YR 6/2), Sandy loam, trace gravel, trace roots (wet) (abundant roots at 3.5 feet) (organic odor)
	4.0	Light gray (10YR 6/1), Sandy loam, little coarse gravel, trace roots (wet) (dull mottling)

NOTES: (1) Auger terminated at 5.0 feet.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/19/00

LOGGED BY:

Hand Auger <u>No.</u> HA-17	Depth Range (ft.)	Generalized Soil Description
	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 2.5	Light gray (10YR 6/1), Silty clay loam, trace roots (mottled) (damp) (little fine sand, trace gravel at 2.0 to 2.5 feet)
	2.5 - 4.0	Gray (10YR 5/1), Sandy loam, little gravel (moist to wet) (dull mottling) (gravel lense at 3.0 \pm feet)
	4.0	Light gray (10YR 7/2), Loamy sand, little gravel (wet)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 3.3 feet; caved to 3.8 feet at completion.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/13/00

LOGGED BY:

SLK

Hand Auger No. HA-18	Depth Range (ft.)	Generalized Soil Description
11/4 10	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 2.5	Gray (10YR 5/1), Silty clay loam, trace roots (moist) (mottled) (sticky)
	2.5 - 4.0	Dark gray (10YR 4/1), Sandy loam, little coarse gravel (wet) (dull mottling)
	4.0	Brownish yellow (10YR 6/8), Silty clay loam, trace roots (wet) (highly mottled)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Bottom at 5.0 feet; water level at 2.0 feet at completion.

HAND AUGER **DESCRIPTIVE LOG**

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Coles Point Spray Irrigation

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		t t
Hand Auger <u>No.</u> HA-19	Depth Range (ft.)	Generalized Soil Description
Hero	0 - 0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
, i	0.1 - 2.0	Light yellowish brown (2.5Y 6/4), Silty clay loam, trace roots (damp) (dull mottling)
	2.0 - 4.3	Light brownish gray (2.5Y 6/2), Sandy loam, little gravel (moist to wet) (mottled) (more yellow and brownish yellow color at 3.5 to 4.3 feet)
	4.3	Brownish yellow (10YR 6/8), Silty clay loam, trace gravel, trace indurated/cemented fragments (wet) (highly mottled)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Bottom at 5.0 feet; water level at 3.0 feet at completion.

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Hand Auger No. HA-20	Depth Range (ft.)	Generalized Soil Description
in Caro	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 2.0	Gray (10YR 5/1), Silty clay loam, trace roots, (damp) (medium stiff) (mottled)
	2.0 - 3.8	Dark grayish brown (10YR 4/2), Sandy loam, little coarse gravel, (moist) (dull mottling)
	3.8	Light gray (10YR 7/1), Silty clay loam, trace roots, trace indurated/cemented fragments (highly mottled)

NOTES: (1) Auger terminated at 5.0 feet.
(2) Bottom at 5.0 feet; water level at 3.0 feet at completion.

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Hand Auger No. HA-21	Depth Range (ft.)	Generalized Soil Description
2 14 V don 1	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 2.0	Gray (10YR 5/1), Silty clay loam, trace roots (wet at 2.0 feet) (mottled)
	2.0 - 2.5	Gray (10YR 5/1), Sandy clay loam, trace to little gravel, trace roots (wet) (dull mottling)
	2.5 - 4.5	Dark grayish brown (10YR 4/2), Sandy loam, trace to little gravel (wet) (dull mottling) (more yellow and yellowish-brown color at 4.0 - 4.5 feet)
•	4.5	Yellowish brown (10YR 5/6), Silty clay loam, trace indurated/cemented fragments, trace roots, trace gravel (wet) (highly mottled)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Bottom at 5.0 feet; water level at 1.9 feet at completion.

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Hand Auger No. HA-22	Depth Range (ft.)	Generalized Soil Description
THE CALL	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 3.0	Dark gray (10YR 4/1), Silty clay, trace roots (wet) (mottled) (little fine sand 2.0 to 3.0 feet)
	3.0 - 4.0	Brownish yellow (10YR 6/8), Sandy loam, trace gravel (wet) (mottled) (little to some silty clay 3.5 to 4.0 feet)
	4.0	Dark gray (10YR 4/1), Silty clay, trace indurated/cemented fragments (wet) (mottled)

NOTES:

(1) Auger terminated at 5.0 feet.

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Hand Auger No. HA-23	Depth Range (ft.)	Generalized Soil Description
	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 2.5	Light olive brown (2.5Y 5/4), Silty clay loam, trace roots, trace gravel (moist) (dull mottling) (little to some fine sand 2.0 to 2.5 feet)
	2.5 - 3.5	Grayish brown (2.5Y 5/2), Sandy loam, little to trace coarse sand/gravel (wet) (dull mottling)
	3.5	Brownish yellow (10YR 6/8), Silty clay loam, trace indurated/cemented fragments, trace roots (wet) (brightly mottled)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 3.3 feet; bottom at 5.0 feet at completion.

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Hand Auger <u>No.</u> HA-24	Depth Range (ft.)	Generalized Soil Description	
	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers	
	0.4 - 1.0	Olive brown (2.5Y 4/4), Silty clay loam, trace roots, (moist)	
* .	1.0 - 2.0	Light olive brown (2.5Y 5/6), Silty clay loam, trace roots, trace gravel (damp)	
	2.0 - 3.0	Light olive brown (2.5Y 5/4), Silty clay loam, trace roots (dull mottling) (moist to wet)	
	3.0 - 3.5	Dark grayish brown (2.5Y 4/2), Sandy loam, trace to little coarse gravel (wet) (mottled)	
	3.5	Brownish yellow (10YR 6/8), Silty clay loam (wet) highly mottled) (trace to little fine sand 4.5 to 5.0 feet)	

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 3.5 feet; bottom at 5.0 feet at completion.

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GeoProbe No HA-25	Depth Range (ft.)	Generalized Soil Description
· · · · · · · · · · · · · · · · · · ·	0.0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 2.0	Dark grayish brown (10YR 4/2), Silty clay, trace roots (moist) (highly mottled) (medium to low plasticity)
	2.0 - 4.0	Gray (10YR 5/1), Sandy loam, trace gravel (wet) (mottled)
	4.0 - 4.5	Yellow (10YR 7/8), Loamy sand, some coarse gravel, trace roots (wet) (mottled)
	4.5 - 5.0	Yellowish brown (10YR 5/6), Sandy loam, little indurated/cemented fragments, trace coarse gravel, trace roots (wet) (brightly mottled)

NOTES:

(1) Boring hole terminated at 5.0 feet.(2) Water level at 1.0 foot; cave to 3.5 feet at completion.

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Hand Auger No.	Depth Range (ft.)	Generalized Soil Description
HA-26	0 - 0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.1 - 1.5	Olive brown (2.5Y 4/4), Silty clay loam, trace roots (damp) (increasing mottling with depth)
	1.5 - 2.5	Yellowish brown (10YR 5/6), Silty clay, trace roots (moist to wet) (mottled)
	2.5 - 4.5	Dark grayish brown (10YR 4/2), Sandy loam, some coarse gravel, trace roots (wet)
	4.5	Light gray (10YR 7/1), Silty clay, trace coarse gravel, trace roots (wet) (brightly colored) (mottled)

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 1.3 feet; bottom at 5.0 feet at completion.

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Hand Auger No. HA-27	Depth Range (ft.)	Generalized Soil Description	
117-21	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers	
	0.3 2.0	Light olive brown (2.5Y 5/4), Silty clay, trace roots, trace gravel (moist) (slight mottled)	
	2.0 - 2.5	Gray (10YR 5/1), Sandy clay loam, trace coarse gravel, trace roots (moist) (dull mottling)	
	2.5 - 4.0	Yellowish brown (10YR 5/4), Loamy sand, little to some gravel, trace roots (wet) (dull mottling) (more brownish yellow color at 4.0 feet \pm)	
	4.0	Brownish yellow (10YR 6/8), Silty clay (wet) (mottled)	

- (1) Auger terminated at 5.0 feet.(2) Water level at 2.2 feet; caved at 2.8 feet at completion.

HAND AUGER **DESCRIPTIVE LOG**

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Hand Auger <u>No.</u> HA-28	Depth Range (ft.)	Generalized Soil Description	
	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers	
	0.2 - 1.0	Dark brown (10YR 3/3), Silty clay loam, trace to little gravel, trace roots	
	1.0 - 3.5	Light yellowish brown (2.5Y 6/4), Silty clay loam, trace roots, trace gravel (moist) (dull mottling)	
	3.5 - 4.0	Light brownish gray (2.5Y 6/2), Sandy clay loam (moist) (mottled)	
	4.0 - `	Light gray (10YR 6/1), silty clay loam, trace roots (moist) (highly mottled)	

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 4.7 feet; bottom at 5.0 feet at completion.

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Hand Auger No. HA-29	Depth Range (ft.)	Generalized Soil Description	
1 11 1 20	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers	
4	0.2 - 2.5	Yellowish brown (10YR 5/4), Silty clay loam, trace gravel, trace roots (friable 0.2 to 1.5 \pm feet)	
•	2.5 - 3.5	Grayish brown (10YR 5/2), Silty clay loam, trace gravel (moist) (mottled)	
	3.5	Pale brown (10YR 6/3), Sandy loam, trace to little indurated/cemented fragments, trace roots (moist to wet) (highly mottled)	

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 4.7 feet; bottom at 5.0 feet at completion.

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Hand Auger No. HA-30	Depth Range (ft.)	Generalized Soil Description
	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers (sandy)
•	0.3 - 2.0	Yellowish brown (10YR 5/4), Silt loam, trace gravel, trace roots (friable) (gravely lense at 1.5 \pm feet)
	2.0 - 3.0	Yellowish brown (10YR 5/6), Sandy loam, trace gravel, trace roots (low plasticity) (slightly mottled)
	3.0 - 4.5	Yellowish brown (10YR 5/8), Silty clay loam, trace indurated/cemented fragments, trace roots (low plasticity) (mottled)
	4.5	Brownish yellow (10YR 6/8), Silty clay loam, trace roots (mottled)

NOTES:

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Hand Auger No. HA-31	Depth Range (ft.)	Generalized Soil Description
	0 - 0.5	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.5 - 2.8	Grayish brown (2.5Y 5/2), Silty clay loam, trace gravel, trace roots (mottled 1.0 to 2.8 feet) (low to medium plasticity)
	2.8 - 4.0	Gray (10YR 5/1), Sandy loam, little coarse gravel, trace roots (moist) (mottled)
	4.0	Light gray (10YR 6/1), Silty clay loam, trace coarse gravel (moist to wet) (mottled)

NOTES:

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Hand Auger <u>No</u> HA-32	Depth Range (ft.)	Generalized Soil Description	
	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers	
	0.2 - 0.5	Light olive brown (2.5Y 5/6), silty clay loam, abundant roots	
· .	0.5 - 1.5	Light olive brown (2.5Y 5/4), Sandy loam, trace gravel, trace roots (slightly mottled 1.0 to 1.5 feet)	
	1.5 - 2.5	Brownish yellow (10YR 6/8), Sandy loam, trace gravel, trace roots (1.0 to 1.5 feet)	
•	2.5 - 3.0	Brownish yellow (10YR 6/6), Silty clay, trace roots (mottled) (low to medium plasticity)	
	3.0	Brownish yellow (10YR 6/8), Silty clay, trace roots trace indurated/cemented fragment) (highly mottled) (possible saturated 4.5 to 5.0 feet)	

NOTES:

(1) Auger terminated at 5.0 feet.(2) Water level at 4.8 feet; bottom at 5.0 feet at completion.

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Hand Auger No. HA-33	Depth Range (ft.)	Generalized Soil Description	
ПА-33	0 - 0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers	
•	0.1 - 1.0	Light olive brown (2.5Y 5/6), Silty clay loam (moist) (slightly mottled) (soft)	
•. •.	1.0 - 2.0	Dark gray (10YR 4/1), Sandy loam, trace gravel, trace roots, trace possible shell fragments (wet) (mottled)	
	2.0 - 2.5	Dark gray (10YR 4/1), Sandy loam, some gravel, trace roots (wet)	
	2.5	Brownish yellow (10YR 6/8), silty clay (possible saturated) (highly mottled)	

- (1) Auger terminated at 4.0 feet due to clay (impervious lense).(2) Water level at 1.3 feet; bottom at 4.0 feet at completion.
- (3) Approximate 6 feet east of creek.

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Hand Auger No. HA-34		Depth Range	(ft.)	Generalized Soil Description
11704		0 -	0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
		0.1 -	1.5	Very dark grayish brown (2.5Y 3/2), Silty clay loam (abundant roots 0.1 to 0.8 feet) (trace roots 0.8 to 1.5 feet) (slight brownish yellow mottling 0.8 – 1.5 feet) (soft) (moist)
		1.5 -	2.2	Dark grayish brown (10YR 4/2), Silty clay loam, trace coarse gravel, trace roots, (mottled) (moist to wet) (groundwater observed at 2.0 feet with bottom at 2.2 feet)
	•	2.2 -	3.5	Yellowish brown (10YR 5/4), Sandy loam, some fine gravel, organic roots (wet)
•		3.5 -	• • •	Yellowish brown (10YR 5/6), Silty clay (highly mottled) (possible saturated)

NOTES: (1) Auger terminated at 5.0 feet.

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Hand Auger No. HA-35	Depth Range (ft.)	Generalized Soil Description
	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 1.8	Light olive brown (2.5Y 5/6), Silty clay loam, trace roots (slightly mottled) (low to medium plasticity)
	1.8 - 3.0	Gray (10YR 5/1), Sandy loam, trace roots (damp) (dull mottling)
	3.0	Light gray (10YR 7/1), Silty clay loam, trace roots (trace gravel at 3.0 \pm feet) (moist 3.0 to 4.0 feet) (wet 4.0 to 5.0 feet) (mottled)

NOTES:

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Hand Auger No. HA-36	Depth Range (ft.)	Generalized Soil Description
711 (00	0 - 0.5	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
·	0.5 - 2.4	Light olive brown (2.5Y 5/4), Silty clay loam, trace roots
	2.4 - 3.5	Dark yellowish brown (10YR 4/4), Sandy loam, trace to little gravel (damp) (dull mottling)
	3.5	Brownish yellow (10YR 6/8), Sandy loam, trace gravel, trace roots (moist) (mottled)

NOTES:

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Hand Auger No. HA-37	Depth Range (ft.)	Generalized Soil Description
·	0 - 0.7	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.7 - 2.5	Yellowish brown (10YR 5/4), Silty loam, trace gravel, trace roots
·	2.5 - 4.0	Yellowish brown (10YR 5/6), Silty clay loam, trace gravel, trace roots (dull mottling)
	4.0	Brownish yellow (10YR 6/8), Silty clay loam, trace roots (damp to moist) (highly mottled) (low to medium plasticity)

NOTES:

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Hand Auger No.	Depth Range (ft.)	Generalized Soil Description
HA-38	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 1.5	Light olive brown (2.5Y 5/6), Sandy loam, trace roots (damp)
	1.5 - 2.5	Light olive brown (2.5Y 5/6), Silty clay loam, trace roots (damp)
	2.5 - 4.2	Yellowish brown (10YR 5/8), Sandy loam, trace gravel, trace roots (moist) (mottled)
	4.2	Light gray (10YR 7/2), Sandy loam, trace roots (wet) (mottled)

- (1) Auger terminated at 5.0 feet.(2) Dry and open to 5.0 feet at completion.

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Hand Auger No.	Depth Range (ft.)	Generalized Soil Description
HA-39	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 1.5	Olive brown (2.5Y 4/4), Sandy loam, trace roots
	1.5 - 3.0	Dark yellowish brown (10YR 4/6), Sandy loam, trace gravel (damp)
	3.0 - 4.0	Dark yellowish brown (10YR 4/4), Sandy loam (damp to moist) (mottled)
	4.0	Brownish yellow (10YR 6/6), Sandy loam (moist) (highly mottled)

NOTES:

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Hand Auger	Depth Range (ft.)	Generalized Soil Description
HA-40	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 0.7	Olive brown (2.5Y4/4), Silty loam, trace roots
	0.7 - 3.0	Yellowish brown (10YR 5/6), Silty clay loam, trace gravel, trace roots
	3.0 - 4.0	Yellowish brown (10YR 5/6), Silty clay loam, trace roots (slightly mottled)
	4.0	Yellowish brown (10YR 5/8), Silty clay loam, trace roots (mottled)

NOTES:

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Hand Auger No. HA-41	Depth Range (ft.)	Generalized Soil Description
ПА-4 I	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 2.7	Very dark grayish brown (2.5Y 3/2), Silty clay loam, trace gravel, trace roots
. *	2.7 - 4.0	Light brownish gray (10YR 6/2), Silty clay loam, trace vegetative fibers (moist) (highly mottled)
•	4.0	Light brownish gray (10YR 6/2), Silty clay loam, little coarse gravel, trace roots (trace dark red brown, black blotches/pockets) (moist) (highly mottled)

NOTES:

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Hand Auger No. HA-42	Depth Range (ft.)	Generalized Soil Description
	0, - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 1.5	Light olive brown (2.5Y 5/6), Sandy loam, trace roots, trace gravel
	1.5 - 2.5	Pale brown (10YR 6/3), Sandy loam, little to trace gravel
	2.5 - 4.0	Light brownish gray (10YR 6/2), Loamy sand, trace to little gravel, (olive brown clayey silt and fine sand balls/pockets at 3.5 to 4.0 \pm feet)
	4.0	Brownish yellow (10YR 6/6), Silty clay loam, trace roots (moist to damp) (highly mottled 4.5 to 5.0 feet)

- (1) Auger terminated at 5.0 feet.(2) Dry and open to 5.0 feet at completion.

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Hand Auger	Depth Range (ft.)	Generalized Soil Description
HA-43	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers (sandy)
	0.3 - 1.0	Light olive brown (2.5Y 5/6), Sandy loam, trace roots (friable)
	1.0 - 2.0	Brownish yellow (10YR 6/8), Sandy loam
	2.0 - 3.0	Brownish yellow (10YR 6/6), Sandy loam, trace to little gravel
	3.0 - 3.5	Light yellowish brown (10YR 6/4), Sandy loam, trace to little gravel
•	3.5 - 4.5	Light yellowish brown (10YR 6/4), Sandy loam, (mottled)
	4.5	Light yellowish brown (10YR 6/4), Sandy loam, (damp) (highly mottled)

- (1) Auger terminated at 5.0 feet.(2) Dry and open to 5.0 feet at completion.

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Hand Auger No. HA-44	Depth Range (ft.)	Generalized Soil Description
ПА-44	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers (sandy)
	0.3 -: 1.0	Light olive brown (2.5Y 5/6), Sandy loam, trace roots (friable)
	1.0 - 2.3	Brownish yellow (10YR 6/8), Sandy loam, trace gravel, trace roots
	2.3 - 3.5	Yellowish brown (10YR 5/8), Sandy loam, little gravel, trace roots
	3.5 - 4.5	Light olive brown (2.5Y 5/6), Sandy loam, (damp) (mottled)
	4.5	Brownish yellow (10YR 6/6), Sandy loam (moist)

NOTES:

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/12/00

LOGGED BY:

SLK

Hand Auger No.	Depth Range (ft.)	Generalized Soil Description
HA-45	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 1.5	Olive yellow (2.5Y 6/6), Silt loam, trace roots (friable)
	1.5 - 3.5	Olive yellow (2.5Y 6/6), Sandy loam, little gravel
•	3.5 - 4.0	Brownish yellow (10YR 6/8), Silty clay, trace medium sand, trace roots (mottled) (low to medium plasticity)
	4.0	Light gray (10YR 7/1), Silty clay, trace roots (mottled) (medium high plasticity)

NOTES:

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/18/00

LOGGED BY: SLK

Hand Auger No. HA-P-1	Depth Range (ft.)	Generalized Soil Description
na-r-1	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 1.8	Olive brown (2.5Y 4/4), Silty clay loam, trace roots (moist) (slightly mottled 1.0 to 1.8 feet)
	1.8 - 2.0	Light olive brown (2.5Y 5/4), Sandy loam (wet to moist) slightly mottled)
	2.0 - 4.8	Light brownish gray (2.5Y 6/2), Sandy loam (trace gravel at 4.0 feet) (wet) (slightly mottled)
	4.8	Brownish yellow (10YR 6/8), Silty clay (highly mottled)

NOTES:

(1) Auger terminated at 5.0 feet.(2) One-inch observation well installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/18/00

LOGGED BY: SLK

Depth Range (ft.)	Generalized Soil Description
0 - 0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
0.2 - 2.0	Light olive brown (2.5Y 5/4), Silty clay loam, trace roots (moist) (slightly mottled)
2.0 - 3.8	Light brownish gray (2.5Y 6/2), Sandy loam (wet) (slightly mottled) (gravel at 3.7 \pm feet)
3.8	Light gray (10YR 7/1), Loamy sand, some gravel (mottled)
	Range (ft.) 0 - 0.1 0.2 - 2.0 2.0 - 3.8

NOTES:

(1) Auger terminated at 5.0 feet.(2) One-inch observation well installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/18/00

LOGGED BY: SLK

Hand Auger <u>No.</u> HA-P-3	Depth Range (ft.)	Generalized Soil Description
п А- Р-3	0 - 0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.1 - 3.0	Light olive brown (2.5Y 5/4), Silty clay loam, trace roots (moist) (mottled at 1.5 to 3.0 feet)
·	3.0	Light brownish gray (2.5Y 6/2), Sandy loam (wet) (mottled) (brightly colored 3.5 to 5.0 feet)

NOTES:

(1) Auger terminated at 5.0 feet.(2) One-inch observation well installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/18/00

LOGGED BY:

SLK

Hand Auger No. HA-P-4	Depth Range (ft.)	Generalized Soil Description
	0 - 0.1	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.1 - 1.2	Light olive brown (2.5Y 5/4), Silt, trace roots, (somewhat friable 0.1 to 1.0 feet) (mottled at 1.0 to 1.2 feet)
	1.2 - 2.2	Light brownish gray (2.5Y 6/2), Silty clay loam (mottled) (low plasticity) (some fine sand 1.7 to 2.2 feet)
	2.2 - 3.5	Light yellowish brown (2.5Y 6/4), Sandy loam, little gravel (moist to wet) (mottled) (coarse gravel 2.7 to 4.0 feet)
	3.5	Light gray (10YR 7/1), Sandy loam, trace gravel (moist to wet) (mottled) (sandy at 5.0 feet)

- (1) Auger terminated at 5.0 feet.(2) One-inch observation well installed in borehole.
- (3) Boring offset 10 \pm feet due to refusal at 4.0 feet due to coarse gravel.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/8/00

LOGGED BY: SLK

<u> </u>		
GeoProbe No.	Depth Range (ft.)	Generalized Soil Description
G-P-5	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 2.5	Olive brown (2.5Y 4/4), Silty clay loam, trace roots, trace gravel (mottled)
ν.	2.5 - 4.0	Light gray (10YR 7/1), silty clay loam, trace gravel, trace roots (low to medium plasticity) (mottled)
	4.0 - 5.0	Light gray (10YR 7/1), Silty clay loam, trace gravel, trace roots with little cemented fragments (moist to wet) (mottled)
	5.0 - 7.5	Brownish yellow (10YR 6/6), Silty clay loam, trace indurated/cemented fragments (silty lenses) (moist to wet)
	7.5	Grayish brown (10YR 5/2), Silty clay (medium to high plasticity)

- Boring hole terminated at 8.0 feet.
 Offset due to excessive vegetation.
 P-5 installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/8/00

LOGGED BY: SLK

GeoProbe No.	Depth Range (ft.)	Generalized Soil Description
G-P-6	0 - 0.7	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.7 - 1.5	Dark brown (10YR 3/3), Sandy loam, little gravel size cemented fragments (possible iron stone) (damp)
	1.5 - 3.0	Light gray (10YR 7/1), Silty clay, trace cemented fragments (mottled) (some fine sand 2.5 to 3.0 feet)
	3.0	Light gray (10YR 7/1), Loamy sand, trace gravel (gravely lense at 3.0 feet \pm) (moist)

- (1) Borehole terminated at 9.0 feet. Heave at 7.0 feet \pm . (2) Piezometer P-6 installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/8/00

LOGGED BY: SLK

Charles and the same of the sa		
GeoProbe No	Depth Range (ft.)	Generalized Soil Description
G-P-7	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 2.5	Olive brown (2.5Y 4/4), Silty clay, trace coarse gravel (damp to moist, mottled) (gravely lense at 2.5 \pm feet)
	2.5 - 9.0	Light gray (10YR 7/1), Silty clay, trace vegetative fibers (mottled, medium to high plasticity)
	9.0 - 10.0	Yellow (10YR 7/8), Silty clay, little cemented soil fragments
	10.0	Gray (10YR 6/1), Silty clay (inter bedded)

- (1) Borehole terminated at 15.0 feet.(2) Piezometer P-7 installed in borehole.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/8/00

LOGGED BY: SLK

GeoProbe No.	Depth Range (ft.)	Generalized Soil Description
G-P-8	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 1.5	Olive brown (2.5Y 4/4), Silty clay loam, trace vegetative fiber (damp, mottled, little to some fine sand 1.2 to 1.5 feet \pm)
	1.5 - 6.0	Light gray (10YR 7/1), Sandy loam, trace gravel, trace vegetative fibers (wet, mottled)
	6.0	Brownish yellow (10YR 6/6), Loamy sand (wet)

NOTES:

(1) Borehole terminated at 10.0 feet. Heaved at 7.1 feet \pm .

(2) Piezometer P-8 installed in borehole.

HAND AUGER DESCRIPTIVE LOG

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/7/00

LOGGED BY: SLK

GeoProbe No.	Depth Range (ft.)	Generalized Soil Description
G-P-9	0 - 0.2	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.2 - 2.0	Gray (10YR 6/1), Silty clay loam, trace roots
	2.0 - 5.0	Brown (10YR 5/3), Sandy loam, trace gravel (moist)
	5.0 - 7.0	Yellow (10YR 7/6), Silt loam (moist to wet, mottled)
	7.0	Pale brown (10YR 6/3), Loamy sand

NOTES:

(1) Borehole terminated at 10.0 feet due to heaved/caved to 7.5 feet \pm .

(2) Piezometer P-9 installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/7/00

LOGGED BY:

SLK

GeoProbe No.	Depth Range (ft.)	Generalized Soil Description
G-P-10	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.3 - 2.0	Brown (10YR 5/3), Silty clay loam (damp, mottled)
	2.0 - 5.0	Light brownish gray (10YR 6/2), Sandy loam (moist)
· · · · .	5.0	Brownish yellow (10YR 6/6), Silty clay loam, trace gravel, trace roots (moist to wet, lense with little cemented soil fragments 5.0 to 6.0 feet)

- (1) Wet on rods at 6.5 feet.
 (2) Borehole terminated at 12.0 feet.
 (3) Piezometer P-10 installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/7/00

LOGGED BY: SLK

GeoProbe <u>No.</u> G-P-11	Depth Range (ft.)	Generalized Soil Description
	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers (sandy)
	0.4 - 1.5	Olive brown (2.5Y 4/4), Silt loam, trace roots (damp)
·	1.5 - 4.0	Light brownish gray (10YR 6/2), Sandy loam (moist) (yellow and light gray at 5.0 to 6.0 feet)
	4.0 - 6.0	(Moist to wet at 5.0 to 6.0 feet)
	6.0 - 8.0	Light gray (10YR 7/1), Silty clay loam, little indurated/cemented fragments (moist to wet)
	8.0 - 10.5	SAME (Mottled and wet at 10.0 to 10.5 \pm feet)
	10.5	Dark gray (10YR 4/1), Silty clay loam (low plasticity) (sand and gravel lense at 11.5 to 11.6) (thin lenses of fine sand)

- (1) Borehole terminated at 12.0 feet.(2) Piezometer P-11 installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/6/00

LOGGED BY: SLK

GeoProbe No.	Depth Range (ft.)	Generalized Soil Description
G-P-12	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt loam, and abundant root fibers
	0.4 - 1.5	Light yellowish brown (10YR 6/4), Silty clay loam
	1.5 - 5.0	Light yellowish brown (10YR 6/4), Sandy loam, trace gravel
	5.0 - 11.0	Yellow (10YR 7/6), Silt loam, trace gravel, trace cemented soil fragments (moist, mottled)
-	11.0 - 13.0	Light brownish gray (10YR 6/2), Silty clay, trace cemented iron stone (thin stringers inter bedded into silty clay, stiff)
	13.0	Dark gray (10YR 4/1), Clay (very stiff)

- (1) Borehole terminated at 15.0 feet.(2) Piezometer P-12 installed in borehole.

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/6/00

LOGGED BY: SLK

GeoProbe <u>No.</u> G-P-13	Depth Range (ft.)	Generalized Soil Description
G-P-13	0 - 0.5	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.5 - 3.5	Brownish yellow (10YR 6/8), Silty clay, trace gravel, trace roots, (slightly mottled)
	3.5 - 5.5	Light brownish gray (2.5Y 6/2), Sandy loam
	5.5 - 11.0	Brownish yellow (10YR 6/8), Silty clay (lense with cemented soil fragments at 6.0 to 6.5 feet \pm)
	11.0 - 11.5	Light yellowish brown (10YR 6/4), Loamy sand, cemented sand lense, trace gravel
	11.5	Dark gray (10YR 4/1), Clay (stiff)

- (1) Borehole terminated at 15.0 feet.(2) Piezometer P-13 installed in borehole.

DUFFIELD ASSOCIATES, INC. Consultants in the Geosciences

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/7/00

LOGGED BY: SLK

GeoProbe No. G-P-14	Depth Range (ft.)	Generalized Soil Description
G-F-14	0 - 0.4	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers
	0.4 - 3.0	Olive brown (2.5Y 4/4), Silt loam
	3.0 - 5.5	Brown (10YR 5/3), Sandy loam, trace gravel (moist at 5.0 feet)
	5.5 - 7.0	Brownish yellow (10YR 6/6), Sandy loam (moist)
	7.0 - 11.5	Yellowish brown (10YR 5/8), Silty clay, cemented soil fragments (mottled)
	11.5	Brownish yellow (10YR 6/8), Sandy loam, trace gravel (wet)

NOTES:

- (1) Borehole terminated at 15.0 feet.(2) Piezometer P-14 installed in borehole.

DUFFIELD ASSOCIATES, INC. Consultants in the Geosciences

HAND AUGER **DESCRIPTIVE LOG**

PROJECT:

Coles Point Spray Irrigation

W.O. No.:

4649.CA.01

CLIENT:

Resource International, LTD.

DATE:

12/7/00

LOGGED BY:

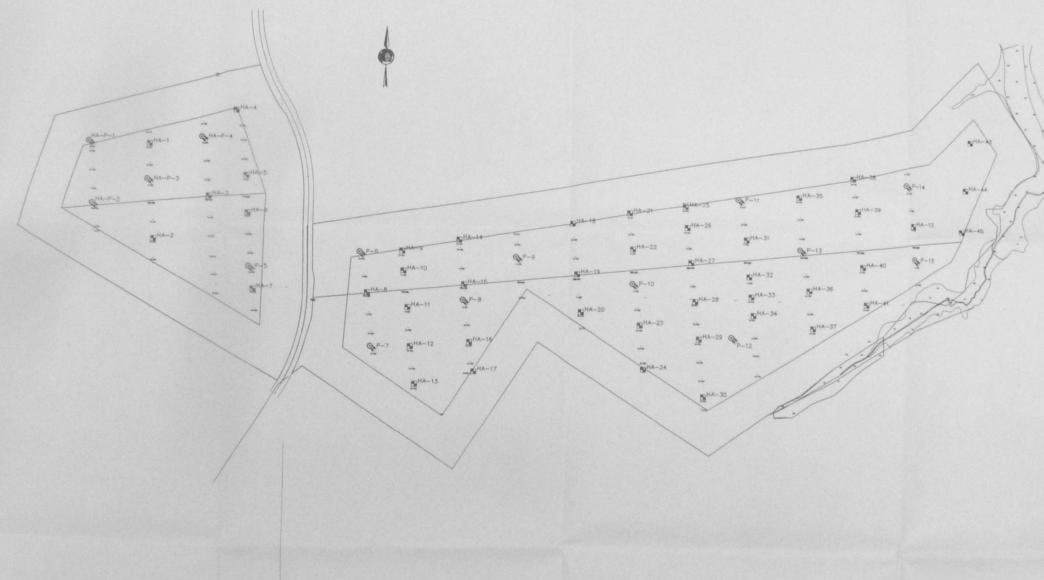
SLK

GeoProbe No. G-P-15	Depth Range (ft.)	Generalized Soil Description
	0 - 0.3	Dark brown (10YR 3/3), decomposing leaves and vegetative material, Silt and abundant root fibers (sandy)
	0.3 - 3.0	Brown (10YR 5/3), Silt loam
	3.0 - 4.0	Brown (10YR 5/3), Loamy sand
	4.0 - 12.0	Light gray (10YR 7/1), Silty clay loam, trace indurated/cemented fragments (thin sandy lenses) (moist) (highly mottled) (low to medium plasticity) (sand and gravel lense 11.0 to 11.3 ± feet) (wet)
	12.0 - 15.5	Light brownish gray (10YR 6/2), Silty clay (medium stiff) (sandy lenses) (mottled)
	15.5	Dark gray (10YR 4/1), Silty clay (stiff) (medium plasticity)

NOTES:

- (1) Boring hole terminated at 16.0 feet.(3) P-15 installed in borehole.

D Soil Boring Locations



APPROXIMATE HAND AUGER LOCATION

APPROXIMATE GEOPROBE BORING LO

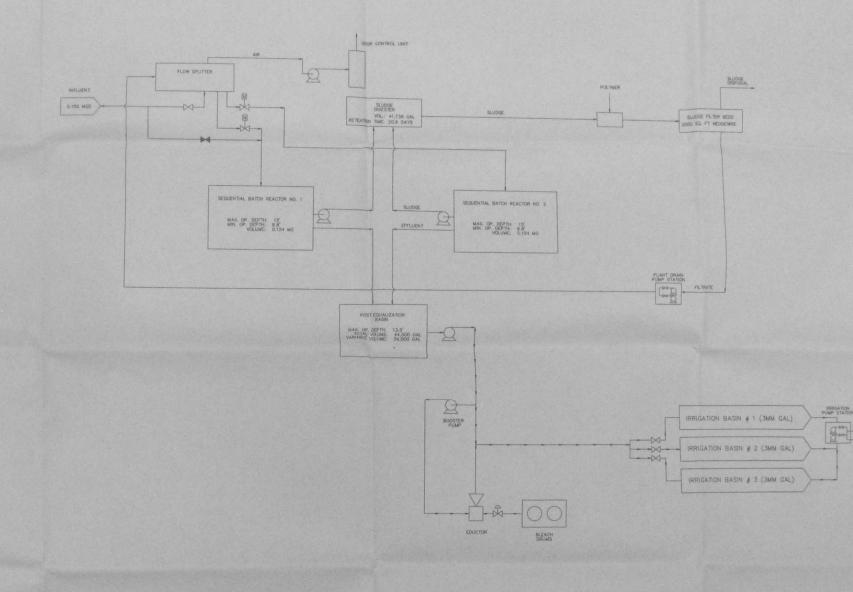
APPROXIMATE GEOPROBE BORING

APPROXIMATE PIEZOMETER LOCATION

NOTE:

THIS LOCATION SKETCH IS ADAPTED FROM A DRAWING TITLED "WESTMOREL COUNTY SANITARY SEWER PLANT" PREPARED BY "HATCHER-SAYRE INC.", DATED 14 NOVEMBER 2000.

E Process Flow Diagram



LEGENO

O SUMP PUMP

VALVE, NORMALLY OPEN

VALVE NORMALLY CLOSED

N CHECK VALVE

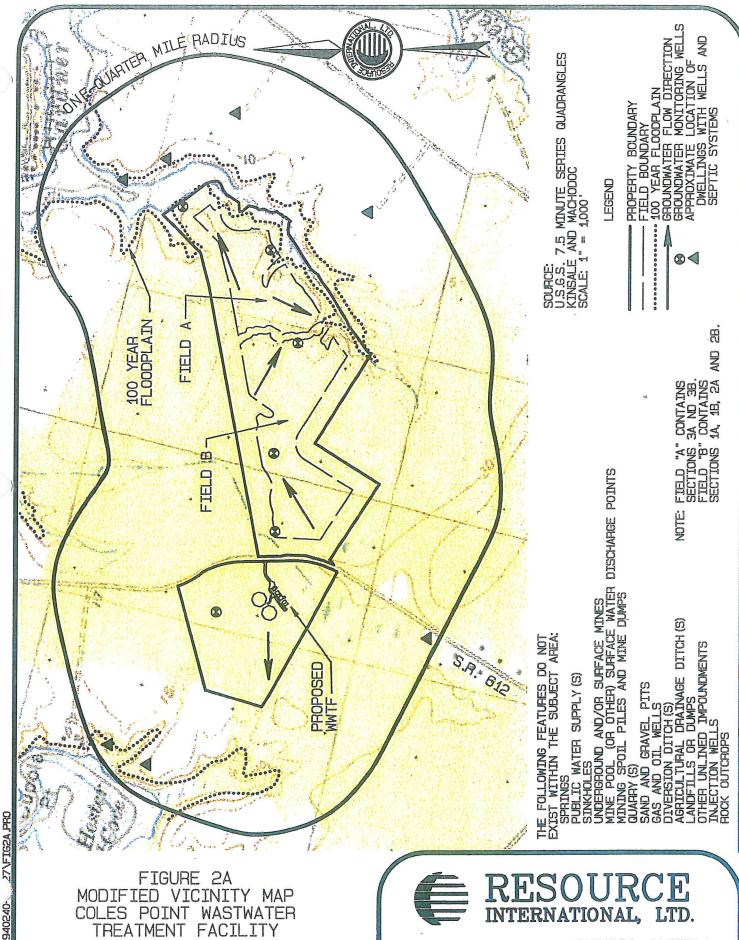
PRESSURE INDICATOR

CONTROL VALVE

MOTORIZED VALVE

OVERALL PROCESS FLOW DIAGRAM

F Facility Layout with Topography



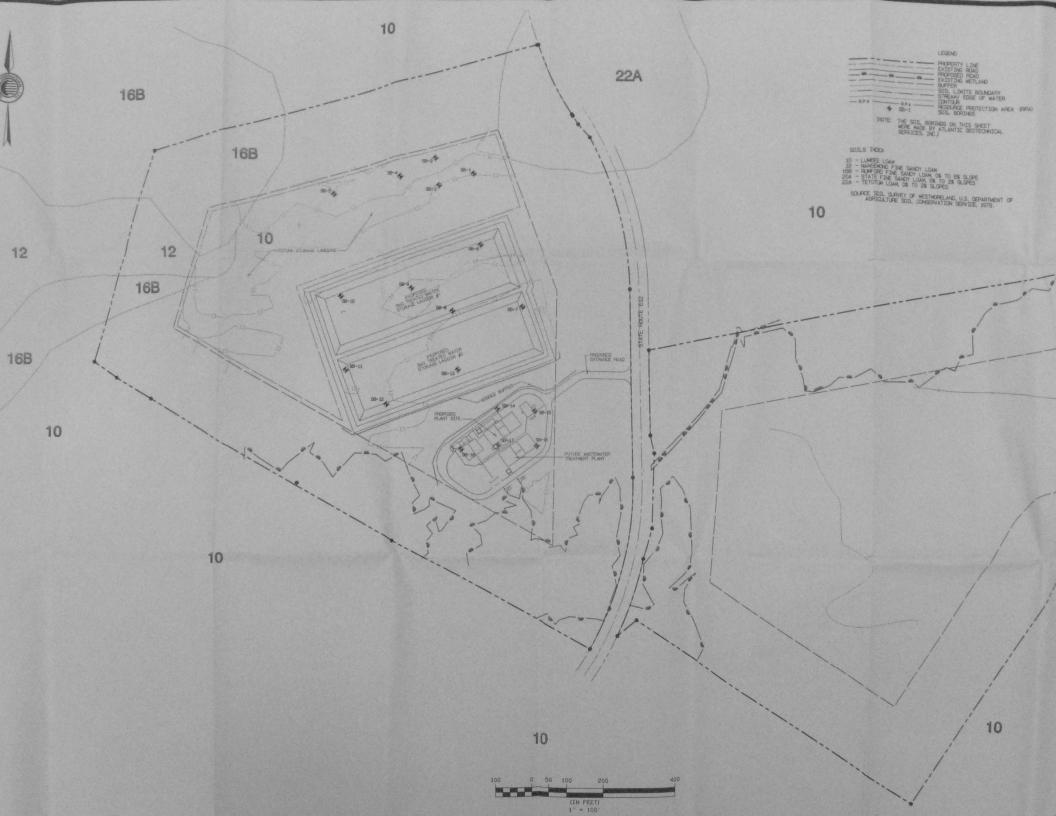
ENGINEERS • SCIENTISTS • SURVEYORS

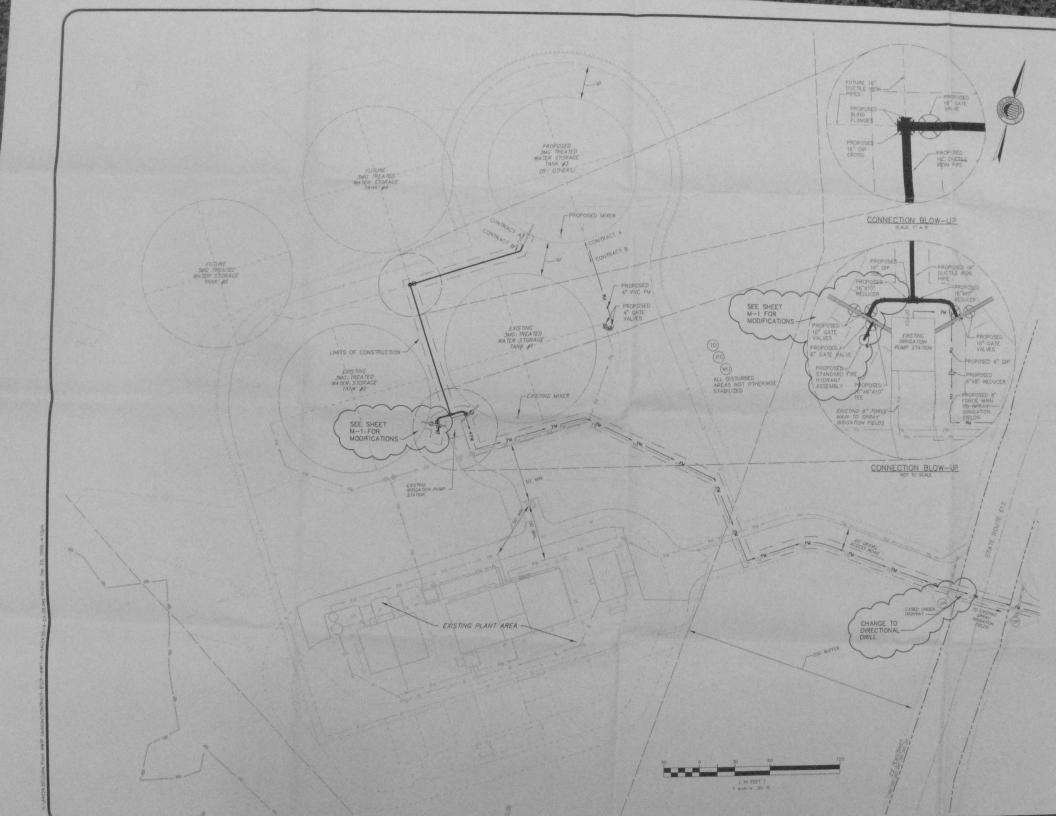
P.O. BOX 6160 ♦ 9560 KINGS CHARTER DRIVE ♦ ASHLAND, VA 23005 (804) 550-9200 ♦ FAX (804) 550-9259

OPLANNERS

H\940240-

WESTMORELAND COUNTY, VIRGINIA





G Soils Map USDA



Map Unit Legend

	Westmoreland County, Vi	rginia (VA193)	
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Bohicket silty clay loam	4.7	4.4%
10	Lumbee loam	55.2	51.8%
20A	State fine sandy loam, 0 to 2 percent slopes	7.3	6.8%
22A	Tetotum Ioam, 0 to 2 percent slopes	39.5	37.0%
Totals for Area of Interest	t .	106.6	100.0%

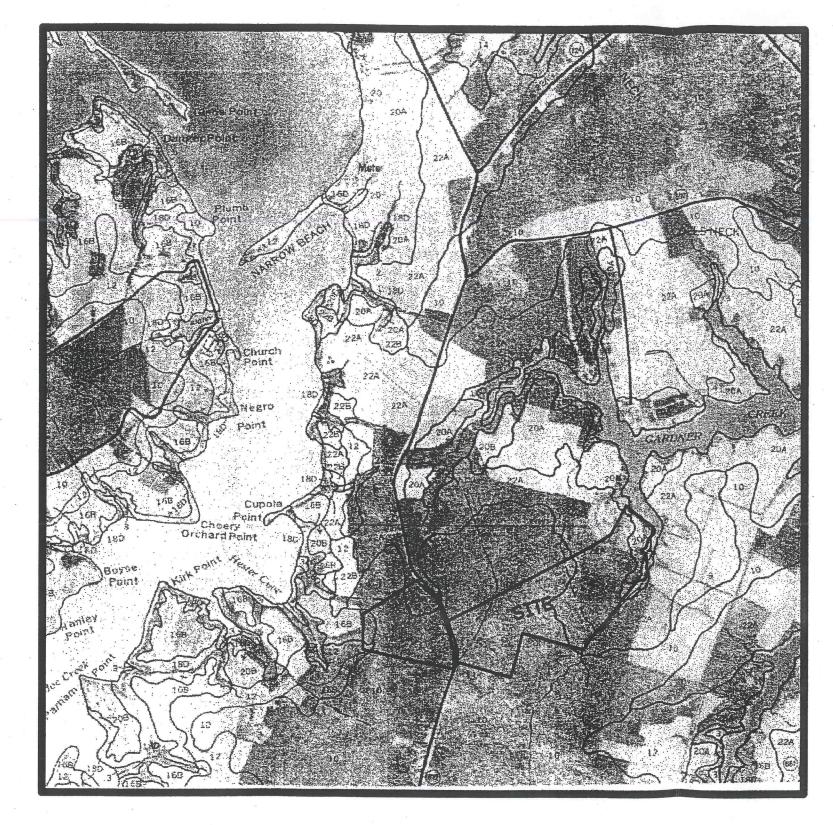




FIGURE 7
SOILS MAP
COLES POINT WASTEWATER
TREATMENT PLANT AREA
WESTMORELAND COUNTY, VIRGINIA



ENGINEERS + SCIENTISTS + SURVEYORS + PLANNERS

P.O. BOX 6160 + 9560 KINGS CHARTER DRIVE + ASHLAND, VA 28005 (804) 550-9200 + FAX (804) 550-9259

SCALE: 1" = 1,666'

SOURCE: SOIL SURVEY OF WESTMORELAND COUNTY, VIRGINIA BY
THE UNITED STATES DEPARTMENT OF AGRICULTURE, SOILS
CONSERVATION SERVICE, IN COOPERATION WITH VIRGINIA
POLYTECHNIC INSTITUTE AND STATE UNIVERSITY.

H Water Budget for Irrigation

VPA Coles Point B M Winn 4/11/2013

month	influent	Usage	Usage	influent	inventory
	day	day	mo	mo	,
Nov	32,000	0	0	960000	960000
Dec	32,000	0	0	992000	1952000
Jan	32,000	0	0	992000	2944000
Feb	32,000	0	0	896000	3840000
Mar	32,000	32000	992000	992000	3840000
Apr	32,000	32000	960000	960000	3840000
May	32,000	64000	1984000	992000	2848000
Jun	32,000	64000	1920000	960000	1888000
Jul	32,000	64000	1984000	992000	960000
Aug	32,000	64000	1984000	992000	32000
Sept	32,000	32000	960000	960000	32000
Oct	32,000	32000	992000	992000	0

Idealized Monthlygeneration, usage, and storage of treated wastewater Assumes constant monthly inputs of water.

Assumes 4 winter months of no usage

Assumes 2 months of light usage, followed by 4 months of heavy usage followed by two months of light usage.

Max Inventory 3.84MM Gal occurs at end of February

Actual flows will vary.

The above rates include future expansions now planned.

Rain/evap from tank approximately balances during a year.

Irrigation is allowed at a rate of 0.25 inches perhour

Pumping capacity limits actual field loading to 0.14 inch per hour.

I Monitoring Well & Sprayfield Divisions

H:\94024-01.27\WELLFIG.PRO FIGURE 1
GHOUNDWATER MONITORING WELL LOCATION MAP
OLES POINT WASTERWATER TREATMENT FACILITY
WESTMORELAND COUNTY, VIRGINIA PROPOSED A MW-14 SIS ZILON ZIVIS MAN NO PERSON NO FIELD SA ◆MM-3 Field 48 FIELD 2A P.O. BOX 5150 + 9550 KINGS CHARTER DRIVE + ASHIAND, YA 23005 (804) 550-9200 + FAX (804) 550-9259 ENGINEERS • SCIENTISTS • SURVEYORS • PLANNERS RE CELT - GHOUNDWATER MONITORING WELL LOCATION RESOURCE INTERNATIONAL, LIE KE CLEUT SCALE 1" = 600" FIELD 38

J Monitoring Well Analyses for Coliform

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				Coles Poi	nt Treatm	Coles Point Treatment Plant Monitor Wells & Surface Water	lonitc	or Wells & §	Surface	Water	FECAL COLLFORM	LIFORM	
	MW1	MW2	MW3	MW4	MW5	MW6		Date	SW1	SW2	SW3	Date	Storage
16-Mar-05	<2.0	<2.0	<2.0	<2.0	<2.0		-	13-Apr-05	23	4	30	22-Feb-12	ŝ.
15-Jun-05	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		13-Jul-05	4	280	80	17-May-12	
21-Sep-05	<2.0	<2.0	220	<2.0	<2.0	30		12-Oct-05	240	20	170	9-Aug-12	
6-Dec-05	<2.0	<2.0	>1600	<2.0	>1600	>1600		11-Jan-06	14	2	70	14-Nov-12	v
15-Mar-06	<2.0	<2.0	>1600	1600	>1600	≥1600		13-Apr-06	<2	<2.0	13		
14-Jun-06	<2.0	< 2.0	<2.0	<2.0	<2.0	<2.0		12-Jul-06	<2	<b>7</b> >	2		. ;
13-Sep-06	2	7	∞	<2>	<2>	<2		11-Oct-06	70	디	1600	- 2	
13-Dec-06	. <2	~ ~	1600	<2	7	80		17-Jan-07	<2	<2>	<2		
14-Mar-07	<2	2	<22	<22	<2	<2		11-Apr-07	13	7	23		
13-Jun-07	<2	<2		<2	<2	< 2>		11-Jul-07	17	23	23	**	
12-Sep-07	<2	<2>	70	<2	<2	<2		16-Jan-08	0.05	0.03	130		
12-Dec-07	<2>	<2	<2	7	<2	4		16-Jan-08	4	< 2	<2>		
12-Mar-08	<2	<2	<2	7	<2	<2>		16-Apr-08	2	<2>	11		
11-Jun-08	<2	4	4	<2	<2	2>		16-Jul-08	4	2	110		
17-Sep-08	<2	<2		<2	<2	<2		15-Oct-08	300	240	300		
11-Dec-08	. <2	<2	<2	<2	<2	7		14-Jan-09	<2	<2	∞		
11-Mar-09	2	<2	<b>7</b>	<2	<2	< 2		15-Apr-09	30	< > <	2>		
10-Jun-09	<2	7	17	70	35	2		16-Sep-09	140	13	. 11		·
16-Sep-09	7	<2	11	<2	220	50		14-Oct-09	>1600	80	50		
17-Dec-09	<2	<2	2	<2	< 2>	2		13-Jan-10	<2>	2	. 50		
10-Mar-10	<2	<2	<u>\$</u>	<b>~</b>	\$	< 2>		14-Apr-10	∞	4	240		
28-Jun-10	<2	<2		<2	<2	< 5		14-Jul-10	1600	350	110		
15-Sep-10	<2	<2	٠	2	<2	. <2		13-Oct-10	20	140	80		
15-Dec-10	<2	<b>~</b>	\$	<2	₹.	<2		12-Jan-11	2	<2	50		
9-Mar-11	<7	<b>~</b>	<2	<2	<2	<2		13-Apr-11	80	8	300		
15-Jun-11	<2	<2		<2	170	∞		13-Jul-11	≥1600	170	140		
14-Sep-11	17	<2	2	<7	220	23		12-0ct-11	34	240	300		
14-Dec-11	<2	<2	7,	<2	200	<2		11-Jan-12	170	20	1600		
14-Mar-12	<2	<2	<2	<5	<2	< 2		11-Jan-12	170	20	1600		
2-Jul-12	<2	. <2		<2	11	13		11-Apr-12	<2	2	80		
2-0ct-12	23	11		>1600	300	1600		11-Jul-12			30		
12-Dec-12	7	<2	30	<2	<2	<2		23-Oct-12		300	23		
13-Mar-13	<2	<2	4	<2>	<2	<b>\( \)</b>		9-Jan-13	2	2	11		

## K Monthly Report Summer

Date	Flow
December 2003	0
January 2004	0
February 2004	0
March 2004	. 0
April 2004	0
May 2004	27,000
June 2004	37,169
July 2004	516,430
August 2004	490,960
September 2004	376,510
October 2004	327,290
November 2004	392,670
December 2004	296,730
	302,819
January 2005	256,777
February 2005	Language and the second
March 2005	340,901 431,342
April 2005	
May 2005	420,416
June 2005	447,891
July 2005	624,260
August 2005	544,451
September 2005	443,426
October 2005	390,022
November 2005	353,645
December 2005	358,820
January 2006	368,344
February 2006	288,629
March 2006	283,122
April 2006	402,824
May 2006	534,200
June 2006	545,990
July 2006	836,420
August 2006	755,590
September 2006	865,830
October 2006	793,680
November 2006	687,390
December 2006	635,400
January 2007	744,110
February 2007	590,490
March 2007	686,140
April 2007	728,880
May 2007	702,180
June 2007	672,700
July 2007	825,670
August 2007	643,110
September 2007	528,260
October 2007	461,730
November 2007	409,660

December 2007	398,969
January 2008	422,150
February 2008	429,540
March 2008	524,110
April 2008	527,610
May 2008	712,310
June 2008	772,550
July 2008	746,050
August 2008	624,580
September 2008	519,610
October 2008	454,560
November 2008	440,640
December 2008	300,040
January 2009	399,470
February 2009	338,290
March 2009	435,950
April 2009	493,330
May 2009	571,570
June 2009	619,390
July 2009	815,235
	791,920
August 2009	626,730
September 2009	548,630
October 2009	
November 2009	696,969
December 2009	637,010
January 2010	426,370
February 2010	422,690
March 2010	433,720
April 2010	352,170
May 2010	461,240
June 2010	616,630
July 2010	506,100
August 2010	527,800
September 2010	503,310
October 2010	591,410
November 2010	327,510
December 2010	317,460
January 2011	371,950
February 2011	259,530
March 2011	324,630
April 2011	321,610
May 2011	319,290
June 2011	279,580
July 2011	785,640
August 2011	985,760
September 2011	1,277,130
October 2011	835,520
November 2011	1,014,000
December 2011	1,045,990

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77N.	January 2012	548,700
1 1	February 2012	660,100
	March 2012	733,940
	April 2012	592,670
	May 2012	682,690
	June 2012	613,220
	July 2012	782,770
	Total Flow:	53,138,221

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					r	·			ı —															Γ								
-	Total Flow:	4/30/2012	4/29/2012	4/28/2012	4/27/2012	4/26/2012	4/25/2012	4/24/2012	4/23/2012	4/22/2012	4/21/2012	4/20/2012	4/19/2012	4/18/2012	4/17/2012	4/16/2012	4/15/2012	4/14/2012	4/13/2012	4/12/2012	4/11/2012	4/10/2012	4/9/2012	4/8/2012	4/7/2012	4/6/2012	4/5/2012	4/4/2012	4/3/2012	4/2/2012	4/1/2012	Date:
	592,670	31,360	32,460	19,860	17,590	21,150	16,760	28,710	33,680	20,690	15,150	8,990	15,510	8,980	16,740	20,670	22,140	18,090	20,320	15,980	18,800	17,770	24,820	23,410	19,810	15,270	15,490	12,330	17,660	21,190	21,290	Flow:
Total Flow:	5/31/2012	5/30/2012	5/29/2012	5/28/2012	5/27/2012	5/26/2012	5/25/2012	5/24/2012	5/23/2012	5/22/2012	5/21/2012	5/20/2012	5/19/2012	5/18/2012	5/17/2012	5/16/2012	5/15/2012	5/14/2012	5/13/2012	5/12/2012	5/11/2012	5/10/2012	5/9/2012	5/8/2012	5/7/2012	5/6/2012	5/5/2012	5/4/2012	5/3/2012	5/2/2012	5/1/2012	Date:
682,690	11,420	19,920	39,140	50,710	43,240	29,620	18,010	15,760	14,770	15,520	22,210	23,790	19,260	13,010	15,200	15,000	14,270	20,970	28,590	24,330	23,350	21,250	13,830	16,290	21,270	26,950	23,820	18,420	16,500	23,560	22,710	Flow:
	Total Flow:	6/30/2012	6/29/2012	6/28/2012	6/27/2012	6/26/2012	6/25/2012	6/24/2012	6/23/2012	6/22/2012	6/21/2012	6/20/2012	6/19/2012	6/18/2012	6/17/2012	6/16/2012	6/15/2012	6/14/2012	6/13/2012	6/12/2012	6/11/2012	6/10/2012	6/9/2012	6/8/2012	6/7/2012	6/6/2012	6/5/2012	6/4/2012	6/3/2012	6/2/2012	6/1/2012	Date:
	613,220	24,300	19,440	15,710	14,974	12,186	24,160	35,590	21,920	19,110	15,250	16,750	61,830	140	12,130	26,590	17,470	20,110	11,690	19,160	26,620	27,530	20,350	16,210	18,730	9,340	15,450	24,270	25,840	20,480	19,890	Flow:
Total Flow:	7/31/2012	7/30/2012	7/29/2012	7/28/2012	7/27/2012	7/26/2012	7/25/2012	7/24/2012	7/23/2012	7/22/2012	7/21/2012	7/20/2012	7/19/2012	7/18/2012	7/17/2012	7/16/2012	7/15/2012	7/14/2012	7/13/2012	7/12/2012	7/11/2012	7/10/2012	7/9/2012	7/8/2012	7/7/2012	7/6/2012	7/5/2012	7/4/2012	7/3/2012	7/2/2012	7/1/2012	Date:
782,770	18,230	30,510	30,450	22,460	16,510	15,250	16,160	19,190	25,460	27,220	20,540	19,220	18,020	20,680	22,160	29,140	31,270	20,910	16,950	15,070	15,870	19,420	34,260	42,820	37,800	30,480	37,340	28,740	30,210	35,380	35,050	Flow:

Coles Point Waste Treatment Facility Dally Bench Sheet

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MONTH	Garley	ASSIMILEABILI	30 MIN SSV		107	なりなり	2882	4.00%	5/2	52%	277	626	61.70	65%	67%	65%	がパソ	300	386	659/0	64%	60.00	20%	17.3%	12%	689%	134	76.82	126	かが必	200	19.00	75.00	75%	\$000 \$4	-	
		7	Time Analy		X.50	243	0146	025CO	0000	120	225.0	のあれ	0/4/5	0547	2250	0554	0807	0833	Sign Of Miles	0755	0155	0808	4080	500	6080	2820	20560	のうがっ	080 S	7240		070%	0.80	0800	6800		L'OU
			Time Taken		3000	0335				١,	1			^		85 60	0800	0830			3400	_			2550	0180	7	0/20	22.00	3745	1	1 1		2500	POSO 8200		YU'L
		 NFFLUENT SAMPLE	nifluent Temp T		7 7.7.5	35.8		35.60			5	3	Se.				24.6	24.9				•	~		_	25.0		26.0	26.3	1	J-	27.0	26.7	25.5			461.2
-+		<del>-</del> _	Influent PH		~ << <	283				-	7.78		14.4	S,		3,377	Γ.	1	60 00						1,79	\28 \28 \28	بح	S S	97	シカ	59	2,70	283		5.83		Ś
	-		Time Analyzed In		SCIO	0138				115%	CSCO	1753			, 4500	0051	N	-		2	0)51	3803			025g	5180	0,43		0800	074K	3030						
	0	ampla-	Time Taken Ti		5 550	0135 B			1			5 18CO	02/40 Z	0770	2 02.50	0748	-		-		3760	-			2255	800	S50 C		1	0145 6	1.	64SST (	0802 C807	8510 550	28560	4	
1	CL2 SM20 4500-CL G	Chojne Bestual Sample	CI2 RES. TI		<u>ට</u> නී.ෆ	3.52 6		2,20 6		42	7/0		68	-		Š			_	2.20 C	3.00	- >		0/'	3.39	2.63 6			5.02 4		-	184	88		2.17		
	ಠ				176.5			24.6		25.55					N	٠.,	-	7	25.3			26:3			7	25.2	25.4		25.5	25.79	26.3	6.5		26.0	25.9		
	DO SM18 4500-0 1		TEMP		155	0.49	0,63			0.8X	1. 4. t. C.				S 11/5	0.51		0.36			38.3					0.28	0.65 2	0.50	0.40	300				88.0	· · · · · ·		
-	8	SBR BASIN#2	OG .		1.55		$\neg \neg$			7.500		2000			3		,	1			5.46 0				7.43 1.	2.39 0	1.47 O	250	7.43 C	(0		مل	1.59 (	/4/ (2)	5.42 6		
		88	Time Analyzed Ph		0025 S	0000	クガカン	0145 12		1158 7	C757 7	0354 3	1 75W	0545		2 2 50	0803 7.	7 77 7		0153	5000	0805	- 4		8560	0816	10000	0153		0500	0808	, 0000	. 808.	$\overline{}$		•	NATIONAL VIOLEN
	PH SM16 4500-H B		TIME TAKEN TIM		٦	.		1	١.		4	- 1		ļ	2500		800			らめの	0 8500						- 1	_	1 .	M45 0	SOSIO	460 0655 0700	SOUY C	5000	158 0	- 1	Out Civilization Six
	E				0,000	35,380 0035	32,210 0440	28,540 01-13	37,340 0755	1/08/7	18000000	2820	1,2600	19,420 0040	0 0%	0000	9500	076	31,270 0743	39,140	22,160 0	20,000,00	18,020 ONSES	192200500	20,540 0755	27,220 0810	25,4600050	19,190 0	1600	15,250 0145	11.510 0805	1460 6	24500	30,510 0045 0158	18,230 0758		KT BOADOTO NA
		-	L DAILY+	640	120 W	200 35	$\neg$	- 1		840 36	140 37	760 2	72036	140 19	16	280 15	230 16	1 40 30	0	150 33								840 19		250 15	760 11	12622015	12 OS 25	180 2	410/18		Cas a laws T
			INFFLUENT TOTAL	53556640	53591680 15,020,0103	43627010	53657280	53486030	53723360	23,129840	,53797640	05/00/88/00/60 46/88200/50	53814120 34,260 0040	063894140	53419814	:39.35'c	39420	28972880	53994210	10 54023350	115404510	1854066190	19 5408421G	20 5-4/03 4/30	2154123970	254151190	54176650	541195840	54212,000	54227250	54248760	542 66	54396676 30450 0804 0808	30541327180	3154345410		NOTE: PH TAKEN OF FEET JENT SAMPLE EROM STORAGE TANK DI JUNG MONTUL X TESTIN
			DAY	Pevious Day	1.	2 6	55	15	\$ \$	8	3	S.	9	10 B	£ 50	12 5	135	1 2	15	18	17.	18 5	19	20 \$	215	22	23	24	25	28	. 27 5	28 \$	29 \$	30	3	-	IOTE: BU TAVE

749 782,770 AUG 25,250.645

Page 1 of 1 Coles Point Wastewater TP

VPA01423

ATTACHMENT D.2
VPA MONITORING REPORT
Location: Flow Meter
Wastewater Monitoring
This monitoring is required by VPA01423, Part I.A. Wastewater influent to Storage Pond

December .	November	October	September	August	July	June	May	April	March	February	January	Month	Required Reporting	Sample Type	Frequency	Units	Limits	Parameter
	A SECURIO DE PROPERTO DE PROPE			Omeranda eta eta en	25,250,645	energenacjo prije njemenacjo odrebio pravjemenacjem prijesta i odrebio pravjemenacjem pravjemenacjem pravjemen	Angelio Prijakritiski projektiva projektiva projektiva projektiva projektiva projektiva projektiva projektiva	And a state of the		de de l'annuaire	Andreas de la company de la co	· · · · · · · · · · · · · · · · · · ·	1/Month	Measure	Continuous	MGD	Z	Influent Flow (Avg.)
32	2.9	950	20,	16	182,110 IA							· · · · · · · · · · · · · · · · · · ·	1/Month	Recorded	Continuous	MG	N.	Influent Flow (Total)
3R 405, 164		1	597, 705 513 46, 560	1	5 OH8 11E			•				Identify site(s):	1/Month	From D.3	<b>计约分式分支</b>	MG	7	Volume from Storage to each site
,	,	- Activities and a second and a	3 46,560	GGO, G98 812 341, 440	24 108,640					•	•	******	ำ/Month	Calculated	1/Day	MG	Z	Volume in Storage
	en e		2979834	25446	349826							****	1/Month	Calculated	1/Day	MG	<b>P</b>	Remaining Storage Capacity
a _b					5,82	•						会会会会会会会会会	1/Month	Grab	1/Month	s.u.	Z	pН
					W \$ \$							经存货保贷品的存储的	1/Month	9HC	1/Month	mg/l	60 mg/l	· SST
			-		<3.0					-		****	1/Month	8HC	1/Month	mg/l	60 mg/l	BODs

ATTACHMENT D.5
VPA MONITORING REPORT
Location: Land Application Site
Land Application

This monitoring is required by VPA01423 Part I.A. Land Application Monitoring *Requirement of the NMP which expires July 9, 2006

Page 1 of 1 Coles Point Wastewater TP VPA01423

		THE CONTRACTOR OF THE PARTY OF		ed Generalisation			1e:	ts:	Ħ					
	36	egs	28	214	3	B.	Salamin-Solad November (special special specia		andigamentalistation of proceedings of the contract of the con	**************************************				
, 1300 -	1405,164	566,285	131, 298	597705	660,698	311.840		gal,	<b>为长去打查为长去长去去大会大去去大士去去去</b>	menter de la companya del la companya de la company		Applied	Total Gallons	
	, 25	. 25	, 25	556	, 25	, 25		in/hr	0.25	musikatijakimijikoopererikkookokokokosis ooroonimista			in/hr	merenské kotry cznopeński koza działa opropojeki koza najeki kora opropojeki kontrolekie kontrolekie kontrolek
	96.0	5 250	" 34 ° CI .	1.0 ° 50	. 36 .41. 36	99 38		in/day	1.0	entre de la companya			in/period	
	1.33	19		5	1,25			in/wk	2.0				in/wk	
1			: •		:	,	5	in/yr	20			·in/year	Cumulative	Month/Year:
		-						in/winter	5.9	Inches	Cumulative	Feb.		r. July 2015
		•								S.				10

		Ī	T	T	Zone	Units	1	·	]	3.						
			The same of the sa	- Annual Control of the Control of t	ne:	its				#						
3B	13°	225	20	5	3								-			
1.68	2.35	0,51	2.48	25.55	1,30	lb/acre	regissen, en de de companya de la co		安治安安安安安安安				Applied	Nitrogen (PAN) (Fertilizer, etc.)	Available	Effluent Plant
			ring daggestiglaaring meteoraterististen storragottaan opgivaraterististen opgivaraterististen opgivarateristis	envillent muset vertilent in den bestelle den der den der den der der den den den der den der den der den der		lb/acre			安安安安安安安安安安安				•	(Fertilizer, etc.)	Applied	Other N
11.04	18.39	7.56	7,83	14.3	4.01	lb/acre	30 lb/a Nov- Feb*	year 2-5;	year; 160 lb/a	an lh/s firet				date	applied year to	Total PAN
3,90	5,45		5.35	6,30	3,00	lb/acre			*****				Applied	phorus	Phos-	Effluent
				organismostalismismostalismismostalismismostalismismismostalismismismismismismismismismismismismismi		lb/acre	*		海南海南海南海南	2000)	etc.)	(Fertilizer,	Applied	phorus	Phos	Other
19.01	28.13	99.1.1	14.38	<u> </u>	<u> </u>	lb/acre			在中央安全市场				to Date	Applied Year	Phosphorus	Effluent
25.84	36.73	55.01	38, 12	42,14	19,89	lb/acre	•		不安全不安全的			•	_	Applied	Potassium	Effluent
						lb/acre	-		· · · · · · · · · · · · · · · · · · ·			ecc.)	(Fertilizer,	Applied	Potassium	Other
116.63	25.15.	51.49	95,14	13,65	48,7	lb/acre			安全会会会会会			Date	Year to	Applied	Potassium	Effluent

L Typical Monthly Report Winter

Date	Flow
December 2003	0
January 2004	0
February 2004	0
March 2004	0
April 2004	0
May 2004	27,000
June 2004	37,169
July 2004	516,430
August 2004	490,960
September 2004	376,510
October 2004	327,290
November 2004	392,670
December 2004	296,730
January 2005	302,819
February 2005	256,777
March 2005	340,901
April 2005	431,342
May 2005	420,416
June 2005	447,891
July 2005	624,260
August 2005	544,451
September 2005	443,426
October 2005	390,022
November 2005	353,645
December 2005	358,820
January 2006	368,344
February 2006	288,629
March 2006	283,122
April 2006	402,824
May 2006	534,200
June 2006	545,990
July 2006	836,420
August 2006	755,590
September 2006	865,830
October 2006	793,680
November 2006	A STATE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN
December 2006	635,400
January 2007	744,110
February 2007	590,490
March 2007	686,140
April 2007	728,880
May 2007	702,180
June 2007	672,700
July 2007	825,670
August 2007	643,110
September 2007	528,260
October 2007	461,730
November 2007	409,660
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December 2007	398,969
January 2008	422,150
February 2008	429,540
March 2008	524,110
April 2008	527,610
May 2008	712,310
June 2008	772,550
July 2008	746,050
August 2008	624,580
September 2008	519,610
October 2008	454,560
November 2008	440,640
December 2008	300,040
January 2009	399,470
February 2009	338,290
March 2009	435,950
April 2009	493,330
May 2009	571,570
June 2009	619,390
July 2009	815,235
August 2009	791,920
September 2009	626,730
October 2009	548,630
November 2009	696,969
December 2009	637,010
January 2010	426,370
February 2010	422,690
March 2010	433,720
April 2010	352,170
May 2010	461,240
June 2010	616,630
July 2010	506,100
August 2010	527,800
September 2010	503,310
October 2010	591,410
November 2010	327,510
December 2010	317,460
January 2011	371,950
February 2011	259,530
March 2011	324,630
April 2011	321,610
May 2011	319,290
June 2011	279,580
July 2011	785,640
and the second s	985,760
August 2011	1,277,130
September 2011 October 2011	835,520
November 2011	1,014,000
December 2011	1,045,990

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January 2012	548,700
February 2012	660,100
March 2012	733,940
April 2012	592,670
May 2012	682,690
June 2012	613,220
July 2012	782,770
August 2012	619,180
September 2012	575,690
October 2012	705,750
November 2012	521,970
December 2012	550,390
January 2013	529,800
February 2013	451,980
Total Flow:	57,092,981

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VPA MONITORING REPORT
Location: Flow Meter
Wastewater Monitoring
This monitoring is required by VPA01423, Part I.A. Wastewater Influent to Storage Pond

Page 1 of 1 Coles Point Wastewater TP VPA01423

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	ВОDь	COOPER STATE OF THE STATE OF TH	60 mg/l	mg/l	4/8/10-161-	MNOHILL	aHC 1/Month	The second secon	264444644		600	74.0				Andreas and the second	THE CONTRACTOR STREET,		The same of the sa				**************************************	
	TSS	- Commission of the Commission	60 mg/l	l/gm	1/Month	THE POLICE	4/Month		· · · · · · · · · · · · · · · · · · ·	AND CHARLES AND	ć,			Marie (projec			And the Control of th		OF CHILD AND DESCRIPTION OF THE PROPERTY OF TH				- A CONTRACTOR OF THE PROPERTY	
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	Influent Flow (Total)	N	THE THE PROPERTY OF THE PROPER	MG	Continuous	. Recorded	1/Month	1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		CONTRACTOR OF THE PARTY OF THE	6/2/,980 10	Ç		Medical contract cont	2.8	77	and the state of t				tares, mineral electros actuales estrenies estados estrenies estrenies estados estados estados estados estados		nome	
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Paramotor		Limits	- Inte	gas	Frequency	Sample Type	Required Reporting	Month	January	February		March	April	N A Commence of the Commence o	way	June	July	August	September	October		November	December .	

Page 1 of 1 Coles. Point Wastewater TP

VPA01423

Land Application This monitoring is required by VPA01423 Part I.A. Land Application Monitoring *Requirement of the NMP which expires July 9, 2006

AT TACHMENT D.5 VPA MONITORING REPORT Location: Land Application Site

	Pro-manufacture											Effluent '	Applied Year to Date	}	体协作协会协会		- CONTRACTOR CONTRACTO	lb/acre	- The second	-Hitamandemannes				-
8	rugh	S		Jel L	STATE	- Contract of the Contract of	and the second second second			- Annual Commence of the Annual Commence of t			_	·	***	magama yakaya maga maga maga maga maga maga maga m		lb/a			***************************************		-	
WAY TO		Inches	8.0	HIVWILL	AND			AND STREET, ST	with the control of t	resistant and consistent of the constitution o		Other Potassium	Applied (Fertilizer, etc.)	-	omeonorm measurement managed as the state of the state o			lb/acre	endrichelenterenterenterenterenterenterenterent	PARTY OF THE PROPERTY OF THE PARTY OF THE PA	- Filter and the state of the s	ecolorem et desta recolore de lecasol se personante se personante	Militarity Antono de presidenti del Cisti (Capito Mariando	
Month/Year	Cumulative in/year	Washington Commence of the Com	Wyu!	14 Л У II подражения подражения	**************************************	aachtsa-eigea-eideoine erragaa a Napoust eigea-eigea-pita-essa	A PROCESS AND COMPANY CONTRACTOR	energy delpring research and research delpring to the second delegation of the second delpring delegation of the second delar delar delar delar delar delar delar delar del second del seco	Annual material and an advantage of the state of the stat	To the state of th		Effluent	Applied		· 中国中国中国中国中国中国中国中国中国中国中国中国中国中国中国中国中国中国中国		7 10	ID/acre	мерен и поставления поставления поставления поставления поставления поставления поставления поставления поставл Поставления поставления поставления поставления поставления поставления поставления поставления поставления по		- Control to the Control of the Cont	e de la composition della comp		-
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	Total Gallons Applied	<b>清灾济省省域省市农济省市</b> 省市	gal,	20	TRRIGHM	EVENTS	Ozenic	This.	Repured			Other N Applied	Nitrogen (PAN) (Fertilizer, etc.) Applied		<b>经按准据的股份的股份</b>		lb/acre	There is a second transfer of the second tran	- The state of the	The state of the s	en electrostatoros entre proprieta de la companya d	e de la company	Anti-Trivial in correct considerate colored and considerate consid	
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Coles Point Waste Trestment Facility Dally Bench Sheet

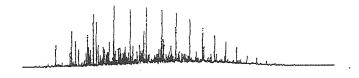
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How:	23,200	14,950	17,600	10,530	14,920	16,570	7,650	15,140	27,640	19,410	14,080	18,050	12,480	19,900	17,460	16,700	21,810	15,530	18,460	7,160	14,910	13,580	11,690	19,220	16,320	8,270	22,650	16,100	451,980
Dafe:	2/1/2013	2/2/2013	2/3/2013	$\sim$	2/5/2013	2/6/2013	/2/	/8/	2/9/2013	2/10/2013	2/11/2013	7	2/13/2013		2/15/2013	/16/	/17/	/18/	/19/	/20/201	~	/22/201	/83/	/24/201	2/25/2013	<b>\</b>	/27/201	2/28/2013	Total Flow:

### M Treated Water Testing Results

Primary Laboratories, Inc.

7423 Lee Davis Road . Mechanicsville, VA 23111 . Telephone (804) 559-9004 . Fax (804) 559-9306



### ANALYTICAL LABORATORY REPORT

26-Mar-13

Westmoreland County Attn; Gary France P.O. Box 1000 Montross, Va. 22520

Project:

Cales Point

Date Received:

13-Mar-13 13-Mar-13

Date Sampled:

1303130-01

Work Order No:

Plant

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
TSS	4.4	1.0	mg/L	2540 D	14-Mar-13 at 10:30	HV
BOD	6.6	3.0	mg/L	5210 B	13-Mar-13 at 7:30	NA

Date Sampled:

13-Mar-13

Work Order No:

1303130-02

Client ID:	Storage					
Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
Describitori	1/0001	(20) 1 ( 1 I Z	1710-000-001-0			
Alkalinity	138.7	1.0	mg/L as CaCO ₃	2320 B	22-Mar-13 at 14:00	NA
Nitrate	22.87	0.20	mg/L	4500 NO3 E	14-Mar-13	NA
					at 17:40	
Total Phosphorus	4.82	0.10	mg/L	4500P E	18-Mar-13	NA
the second of the second			,		at 15:30	



## Primary Laboratories, Inc. Results

26-Mar-13

Date Sampled:

13-Mar-13 1303130-02

Work Order No:

Storage

CHRILLID.	Storage					
Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date	Tech.
		Pall 1/16	MODOMIC	I RUITDETS	Analyzed	Initials
Ammonia	0.29	0.01	mg/L	4500NH ₃ F	15-Mar-13	NA
Chloride	73.1	0.1	mg/L	4500CL G	at 9:30 21-Mar-13	NA
TKN	0.4	0.2	mg/L	4500 N/NH ₃	at 12:00 14-Mar-13	NA
METALS		de serviciones de ser			at 13:00	
Potassium	34,6	1.0	mg/L	3120B	26-Mar-13	HV
Sodium	134.0	10.0	mg/L	3120B	at 13:44 26-Mar-13	HV
					at 13:44	

^{*} All methods are Standard Methods 18th Edition unless otherwise noted. Note: All analyses are NELAC certified except where noted with a (#).

Slanature.

Laboratory Manager

_Date:__

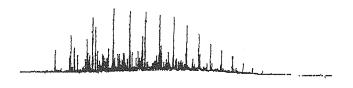
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These analytical results are based upon materials provided by the client and are intended for the exclusive use of the client. These analytical results represent the bast judgement of Primary Laboratories, Inc. Primary Laboratories, Inc. assumes no responsibility, express or implied, as to the interpretation of the analytical results contained in this report. This report is not to be reproduced except with the written approval of Primary Laboratories, Inc.



Primary Laboratories, Inc.

7423 Lee Davis Road · Mechanicsville, VA 23111 · Telephone (804) 559-9004 · Fax (804) 559-9306



### ANALYTICAL LABORATORY REPORT

21-Feb-13

Westmoreland County Attn: Gary France P.O. Box 1000 Montross, Va. 22520

Project:

Coles Point

Date Received:

13-Feb-13

Date Sampled:

13-Feb-13

Work Order No:

1302127-01

Client ID:

Plant

Test Description	Fínal Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
TSS	3.0	1.0	mg/L	2540 D	13-Feb-13	HV
BOD	<3.0	3.0	mg/L	5210 B	at 14:45 13-Feb-13 at 7:30	PB

Date Sampled:

13-Feb-13

Work Order No:

1302127-02

Client ID:

Storage Test Final Reporting Units of Method Date Tech. Description Result Limit' Measure Numbers* Analyzed Initials Alkalinity 132.7 1.0 mg/L 2320 B 19-Feb-13 NA as CaCO₃ at 14:30 Nitrate 14.66 0.20 4500 NO3 E mg/L 14-Feb-13 NA at 14:30 Total Phosphorus 5.36 0.10 mg/L 4500P E 15-Feb-13 NA at 12:00



## Primary Laboratories, Inc. Results

21-Feb-13

Date Sampled:

13-Feb-13 1302127-02

Work Order No: Client ID:

ent ID: Storage

Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date .	Tech.
0.09	0.01	mg/L	4500NH ₃ F	18-Feb-13	NA
76.5	0.1	mg/L	4500CL G	18-Feb-13	NA
<0,2	0.2	mg/L	4500 N/NH ₃	18-Feb-13	NA
				at 14.00	
24.1	1.Q	mg/L	3120 B	20-Feb-13	HV
129.0	10.0	mg/L	3120 B	20-Feb-13	HV
	Final Result 0.09 76.5 <0,2 24.1	Final Reporting Limit  0.09 0.01  76.5 0.1  <0,2 0.2  24.1 1.0	Final Reporting Units of Measure	Final Reporting Result         Reporting Limit         Units of Measure         Method Numbers*           0.09         0.01         mg/L         4500NH ₂ F           76.5         0.1         mg/L         4500CL G           <0,2	Final Result         Reporting Limit         Units of Measure         Method Numbers*         Date Analyzed           0.09         0.01         mg/L         4500NH ₃ F         18-Feb-13 at 9:30           76.5         0.1         mg/L         4500CL G         18-Feb-13 at 13:00           <0,2

* All methods are Standard Methods 18th Edition unless otherwise noted. Note: All analyses are NELAC certified except where noted with a (#).

Sianahura

Parry L Bragg /

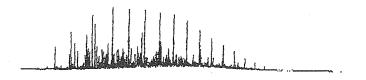
Laboratory Manager

These analytical results are based upon materials provided by the client and are invended for the exclusive use of the client. These analytical results represent the best judgement of Primary Laboratories, Inc. Primary Laboratories, Inc. assumes no responsibility, express or implied, as to the interpretation of the analytical results contained in this report. This report is not to be reproduced except with the written approval of Primary Laboratories, Inc.



### Primary Laboratories, Inc.

7423 Lee Davis Road • Mechanicsville, VA 23111 • Telephone (804) 559-9004 • Fax (804) 559-9306



### ANALYTICAL LABORATORY REPORT

21-Jan-13

Westmoreland County Attn: Gary France P.O. Box 1000 Montross, Va. 22520

Project:

Date Received: Date Sampled:

9-Jan-13 9-Jan-13 1301078-01

Coles Point

Work Order No:

Client ID:

Olamb

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
TSS	2.8	1.0	. mg/L	2540 D	15-Jan-13	ΗV
BOD	<3.0	3.0	mg/L	- 5210 B	at 13:10 11-Jan-13 at 7:30	PB

Date Sampled:

9-Jan-13

Work Order No:

1301078-02

Client ID:	Storage lank					
Test	Final	Reporting	Units of	Method	Date	Tech.
Description	Result	Limit	Measure	Numbers*	Analyzed	Initials
Alkalinity	153.7	1.0	mg/L as CaCO₃	2320 B	21-Jan-13 at 10:00	NA
Nitrate	18.33	0.20	mg/L	4500 NO3 E	10-Jan-13	NA
Total Phosphorus	. 5.96	0.10	mg/L	4500P E	at 16:00 18-Jan-13 at 14:30	NA



## Primary Laboratories, Inc. Results

21-Jan-13

Date Sampled:

9-Jan-13

Work Order No: Client ID: 1301078-02 Storage Tank

VIOILIE.	Storage rank					
Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech,
Ammonia	0.05	0.01	mg/L	4500NH ₃ F	15-Jan-13	NA
Chloride	81.7	0.1	mg/L	4500CL G	at 9:30 14-Jan-13	NA
TKN	0.1	0.1	mg/L	4500 N/NH ₃	at 15:00 15-Jan-13	NA
METALS	Constitution of the consti				at 11:00	
Potassium	142.0	1.0	mg/L	3120 B	21-Jan-13	HV
Sodium	176.0	10.0	mg/L	3120 B	at 14:20 21-Jan-13 at 14:20	HV

[&]quot; All methods are Standard Methods 18th Edition unless otherwise noted. Note: All analyses are NELAC certified except where noted with a (#).

Sinnature

Parry L. Bragg

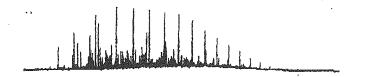
Laboratory Manager

Date: // 20/13

These enalytical results are based upon materials provided by the client and are intended for the exclusive use of the client. These analytical results represent the best judgement of Primary Laboratories, inc. Primary Laboratories, inc. assumes no responsibility, express or implied, as to the interpretation of the analytical results contained in this report. This report is not to be reproduced except with the written approval of Primary Laboratories, inc.



## N Soils Testing Results



### ANALYTICAL LABORATORY REPORT

24-Apr-12

Westmoreland County Attn: Gary France P.O. Bpx 1000 Montross, Va. 22520

Project:

Coles Point - Soll

Date Received:

11-Apr-12

Date Sampled: Work Order No: 29-Mar-12 1204111-01

Client ID.

Soil Samples - Zone 1

Client ID: Soil Samples - Zone 1										
Test	Finel	Reporting	Units of	Method	Date	Tech.				
Description	Result	Limit	Measure	Numbers*	Analyzed	Initials				
рН	5.4	NA	ecs ·	N/A	16-Apr-12	A&L				
Organic Matter	3.4	NA NA	%	N/A	16-Apr=12	A&L				
Cation Exchange Capacity	8.5	NA NA	meq/100g	N/A	16-Apr-12	A&L				
Total Nitrogen	1,060	NA	mg/Kg	N/A	16-Apr-12	A&L				
Organic Nitrogen	1,055	NA	ppm	N/A	16-Apr-12	A&L				
Ammonia Nitrogen	4.8	NA	mg/Kg	N/A	16-Apr-12	A&L				
Available Phosphorus	32	NA	ppm	N/A	16-Apr-12	A&L				
Exchangeable Calcium	822	NA	ppm	N/A	16-Apr-12	A&L				
Exchangeable Magnesium	173	NA	ppm	N/A	16-Apr-12	A&L				
Exchangeable Potassium	87	NA	ppm	N/A	16-Apr-12	A&L				
Exchangeable Sodium	71	NA.	ррт	N/A	16-Apr-12	A&L				

A&L- A&L Eastern Laboratories



### Primary Laboratories, Inc. Results

24-Apr-12

Project:

Coles Point - Soil

Date Received:

11-Apr-12

Date Sampled:

29-Mar-12 1204111-02

Work Order No:

Client ID:	Soll Samples - :	Zone Z				distriction and the second
Test	Final	Reporting	Units of	Method	Date	Tech.
Description	Result	Limit	Measure	Numbers*	Analyzed	Initials
рН	5.8	NA	Sea.	N/A	16-Apr-12	A&L
Organic Matter	4.2	NA	%	NA	16-Арг-12	A&L
Cation Exchange Capacity	9.9	NA	meq/100g	N/A	16-Apr-12	A&L
Total Nitrogen	1,240	NA	mg/Kg	NA	16-Apr-12	A&L
Organic Nitrogen	1,238	NA	ppm	N/A	18-Apr-12	A&L
Ammonia Nitrogen	3.7	NA	mg/Kg	N/A	16-Арг-12	A&L
Available Phosphorus	26	NA	ppm	NA	16-Apr-12	A&L
Exchangeable Calcium	1026	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Magnesium	236	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Potassium	82	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Sodium	59	NA	ppm	N/A	16-Apr-12	A&L

A&L-A&L Eastern Laboratories



## Primary Laboratories, Inc. Results

24-Apr-12

Project:

Coles Point - Soil

Date Received: Date Sampled: 11-Apr-12 29-Mar-12

Work Order No:

1204111-03

Client ID:	Soil Samples -					
Test	Finel	Reporting	Units of	Method	Date	Tech.
Description	Result	Limit	Measure	Numbers*	Analyzed	Initials
рН	5.6	NA		N/A	16-Apr-12	A&L
Organic Matter	4.4	NA	%	N/A	16-Apr-12	A&L
Cation Exchange Capacity	9.0	NA	meq/100g	N/A	16-Apr-12	A&L
Total Nitrogen	1,580	NA	mg/Kg	N/A	16-Apr-12	A&L
Organic Nitrogen	1,576	NA	ppm	N/A	18-Apr-12	A&L
Ammonia Nitrogen	3.6	NA	mg/Kg	N/A	16-Apr-12	A&L
Aveilable Phosphorus	47	NA	ppm	N/A	16-Apr-12	a&l
Exchangeable Calcium	930	NA	ppm	N/A	18-Apr-12	A&L
Exchangeable Magnesium	207	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Potassium	91	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Sodium	- 66	NA	ppm	N/A	16-Apr-12	A&L

A&L-A&L Eastern Laboratories



### Primary Laboratories, Inc. Results

24-Apr-12

Project:

Coles Point - Soil

Date Received:

11-Apr-12 29-Mar-12

Date Sampled: Work Order No:

1204111-04

Client ID: Soil Samples - Zone 4										
Test	Final	Reporting	Units of	Method	Date	Tech.				
Description	Result	<u>Limit</u>	Measure	Numbers*	Analyzed	Initials				
pH	5.8	NA		N/A	16-Apr-12	A&L				
Organic Matter	2.9	NA	%	NA	16-Apr-12	A&L				
Cation Exchange Capacity	6.2	NA	meq/100g	N/A	16-Apr-12	A&L				
Total Nitrogen	1,080	NA	ppm	N/A	16-Apr-12	A&L				
Organic Nitrogen	1,077	NA	ppm	N/A	16-Арг-12	A&L				
Ammonia Nitrogen	3,5	NA	mg/Kg	N/A	16-Apr-12	A&L				
Available Phosphorus	47	NA	ppm	N/A	16-Apr-12	A&L				
Exchangeable Calcium	614	NA	mqq	N/A	16-Apr-12	A&L				
Exchangeable Magnealum	163	NA	ppm	N/A	16-Apr-12	A&L				
Exchangeable Potessium	97	NA	ppm	N/A	16-Apr-12	A&L				
Exchangeable Sodium	70	NA	ppm	N/A	16-Apr-12	A&L				

A&L-A&L Eastern Laboratories



## Primary Laboratories, inc. Results

24-Apr-12

Project:

Coles Point - Soll

Date Received:

11-Apr-12

Date Sampled:

29-Mar-12

Work Order No:

1204111-05

Client ID:	Soil Samples -	Zone S				
Teet	Final	Reporting	Units of	Method	Date	Tech.
Description	Result	Limit	Measure	Numbers*	Analyzed	Inktiels
pH	6.5	NA NA		N/A	16-Apr-12	A&L
Organic Matter	2.8	NA	%	NA	16-Apr-12	A&L
Cation Exchange Capacity	6.8	NA	meq/100g	N/A	16-Apr-12	A&L
Total Nitrogen	1,050	NA	ppm	NA	16-Apr-12	A&L
Organio Nitrogen	1,048	NA	ppm	N/A	16-Apr-12	A&L
Ammonia Nitrogen	1.8	NA ·	mg/Kg	N/A	16-Apr-12	A&L
Available Phosphorus	26	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Calcium	<b>\$5</b> 1	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Magnesium	167	NA	ppm	NA	16-Apr-12	A&L
Exchangeable Potassium	110	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Sodium	94	NA	ppm	, N/A	16-Apr-12	A&L

A&L- A&L Eastern Laboratories



### Primary Laboratories, Inc. Resulta

24-Apr-12

Project:

Coles Point - Soil

8045599306

Date Received:

1-Apr-12

Date Sampled:

29-Mar-12

Work Order No:

1204111-06

Client ID:	Soil Samples -	Zone 6				
Test	Final	Reporting	Units of	Method	Date	Tech.
Description	Result	Limit	Measure	Numbers*	Analyzed	Initials
рH	6.4	NA		N/A	18-Apr-12	A&L
Organic Matter	2,6	NA	%	N/A	16-Apr-12	A&L
Cation Exchange Capacity	5.2	NA	meq/100g	N/A	16-Apr-12	A&L
Total Nitrogen	810	NA	ppm	N/A	16-Apr-12	A&L
Organic Nitrogen	807	NA	ppm	NA	16-Apr-12	A&L
Ammonia Nitrogen	3.0	NA	mg/Kg	N/A	16-Apr-12	A&L
Available Phosphorus	21	NA	ppm	N/A	16-Арг-12	A&L
Exchangeable Calcium	681	NA	ppm	N/A	16-Apr-12	A&L
Exchangeable Magnesium	112	NA	ppm	NA	16-Apr-12	A&L
Exchangeable Potassium	78	NA	ppm	N/A	18-Apr-12	A&L
Exchangeable Sodium	45	NA	ppm	N/A	18-Apr-12	A&L

#### A&L-A&L Eastern Laboratories

Note: All analyses are NELAC Certified except where noted with a (#).

Laboratory Manager

Date:

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VELAP# 460173 DOL8# 237



^{*} All methods are Standard Methods 18th Edition unless otherwise noted.

### BROOKSIDE LABORATORIES, INC.

### ** WATER ANALYSIS REPORT **

Coles Point WWTP

: :

File Number: 52491

Date Received: 7/27/2009 Date Reported: 7/28/2009

Submitted By: M & M Consulting, Inc.

Lab Number Sample Location Sample Description	2	1855 EFFLUENT TANK 1		,	
Hc		8.54			· · · · · · · · · · · · · · · · · · ·
Hardness	(ppm)	93.78			
<b>lardness</b>	(grains/gal)	5.48			
Conductivity .	(mmhos/cm)	1.01			
3odium Adsorp. Rat	io	7.55			
Adjusted SAR		12.24			
OHC .		7.78		•	
Residual Sodium Ca	rbonate (RSC)	3.91			
		(ppm)	meq/1	lbs/ac in	~~
:alcium	(Ca)	21.58	1.08	4.89	
lagnesium	(Mg)	9.38	0.77	2.13	
) issium	(K)	14.99	0.38	3.40	
ium	(Na)	166.95	7.26	37.86	•
1	(Fe)	0.72	, , , , 0	0.16	
'otal Alkalinity	(CaCO3)	287.84		65.28	
arbonate	(CO3)	18.15	0.61	4.12	
icarbonate	(HCO3)	314.32	5.15	71.29	
ydroxide	(OH)	0.00	_ (	ر ميه ۱ مند <u>ا</u>	
'hloride	(C1) ·	106.21	3.00	24.09	
ulfur as	(504)	27.41	0.57	6.22	
alt Concentration	(TDS)	646.40		146.60	
oron	(B)	0.71		0.16	•
anganese	(Mn)	0.020		0.005	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
opper	(Cu)	< 0.020		0.005	
inc	(Zn)	0.245		0.056	
luminum	(A1)	< 0.200	•	, ·	
ation/Anion Ratio		***************************************	1.01		<b>***</b>
D3-N (ppm)		6.25	~~~	•	
otal P (ppm)		4.46			
H4-N (ppm)		0.17			
(N Nitrogen (ppm)		1.26			
		Reviewe	ed by:	1. 176	
12. (22.15.95)	1117.	(	was the second		

## BROOKSIDE LABORATORIES, INC. SOIL AUDIT AND INVENTORY REPORT

Name_Coles Point WWTP	City.		a distributed his transcription at the distributed his distrib	State	
Independent Consultant M & M Consu				Date	/30/2009
		www.govagagagagagagagagagagagagagagagagagaga			
Sample Location LAND APP. SITES	FIELD 1	FIELD 1	FIELD 2	FIELD 2	FIELD 3
Sample Identification	A	В	A	В	À.
Lab Number	0820-1	0821-1	0822-1	0823-1	0824-1
Total Exchange Capacity (ME/100 g)	8.50	7.60	6.17	5.7.7	7,74
pH (H ₂ O 1:1)	7.0	6.7	6.7	7.0	7.3
Organic Matter (humus) %	4.73	4.76	4.42	3.99	5.12
Estimated Nitrogen Release Ib/A	97	98	94	90	. 101
SOLUBLE SULFUR* ppm	13	15	19	12	11
MEHLICH III Ib/A P as BO s ppm of P	183	128 28	211 46	183 40	192 42
MEHLICH III Ib/A P as ${}^{\circ}$ ppm of P  BRAY II Ib/A P as ${}^{\circ}$ ppm of P  ppm of P	224 49	· 114	302 66	321 70	275 60
MEHLICH III ID/A P as QO ₅ ppm of P  BRAY II Ib/A P as QO ₅ ppm of P  OLSEN Ib/A P as QO ₅ ppm of P		-	,		and Zizzowa za na kata na kata za za zi Manajira kata na kata n
面 ( CALCIUM Lb/A	1864	1734	1142	1198	1870
	932	867	571	599 386	935 430
MAGNESIUM*  DO LE POTASSIUM*  DO D	$\frac{624}{312}$	$\frac{464}{232}$	$\frac{446}{223}$	193	215
DO POTASSIUM ID/A	358	178	194	290	342
ppm —	179	89	797	145	I7I
SODIUM* Ib/A	186	184	296	248	240
<b>ppm</b>	93	92	148	124	I20
The state of the s	BASESATURA	TION PERCEN	计数数数数		
Calcium %	54.82	57.04	46.27	51.91	60.40
Magnesium %	30.59	25.44	····· 3·0 :·12 ·	27.87	23.15
Potassium %	5.40	3.00	4.03	6.44	5.66
Sodium: " % " " " "	4.76	5.26	10.43		6.74
Onlei pases 70	4.40	4.70 - 4.50	4.70 4.50	4.40	4.10
Hydrogen %	: (			CHARLEN O. O.	and the second s
THE RESERVE OF THE PROPERTY OF	NEXTRACTAE	***************************************			
Boron* (ppm)	0.74	0.60	0.70	0.65	0.71
lron* (ppm)	212	281	· 270	171	202 252
Manganese* (ppm)	214	38 0.93	156 1.60	1.73	1.17
Copper* (ppm)	1.83	1.54	1,34	1.69	2.10
Zinc* (ppm) "Aluminum" (ppm)	1056	912	. 1264	1245	1078
- Charles Community (ppm)	, , r, L.		75 17 17	, , , , ,	
			1 07		
Chlorides (ppm)	773	! .		7.8	
До (Chlorides (ppm)			} "; i'.		
dyumgan - W.	5.00				

# BROOKSIDE LABORATORIES, INC. SOIL AUDIT AND INVENTORY REPORT

	me Coles Point	: WWTP	C	City		State	<u>`</u>
Ind	ependent Consultant	M & M Con	sulting,	Inc.	i		7/30/2009
***************************************		to the second se					
Sar	mple Location LAND	The state of the s	FIELD	1			
	nple Identification		В				
Lab	Number				V		
Tota	al Exchange Capacity	(ME/100 a)	0825-				
-	H ₂ O 1:1)	7	5.3	5			
	anic Matter (humus)	1/	7	2		- V	
			3.1	0 .			
Estin	nated Nitrogen Relea	se Ib/A ·	8	1			·
edem-co-seppende	SOLUBLE SULF			9			
SNOINS	S MEHLICH III	Ib/A P as POs ppm of P	16	0			
N S	SPAY II  OLSEN	Ib/A Pas PO	3.				
( -"	SS	ppm of P	3.	1			
	OH OLSEN	Ib/A P as PO ₅	-=				
EXCHANGEABLE CATIONS	CALCIUM	Ib/A	1230				
SBL	MACATECHIA	ppm —				-	
HANGEA	MAGNESIUM*	Jb/A ppm — —	324	1			
IS E	POTASSIUM*	Jb/A	162	1			
A S		ppm )	H				
Ϋ́	SODIUM*	Ib/A	186	1			
<u>M</u>		ppm		1	<del> </del>	+	
			ASE SATURA	TION PERCE	NT	A Commence	The second secon
	Calcium %		57.48				
	Magnesium % Potassium %		25.23				•
	Potassium % Sodium %		5.61				
	Other Bases %		7.56			-	
	Hydrogen %		4.20 0.00				
ACCOUNTED TO A STATE OF THE PARTY OF THE PAR					Bartiness many managers and		
	Вогол* (рет)		EATRACIAE	LE MINORS		A Company of the Comp	
	Iron* (ppm)		0.72				
	Manganese* (pr	om)	123		-		
	Copper (ppm)		1,03				
	Zinc" (ppm)		1.68				
W. Washington	Aluminum° (ppn	2)	1034				
	Soluble Relie						
STS	Soluble Salts (n Chlorides (ppm)	nmnos/cm)			Control of the second of the s		
TESTS	· cuorides (bbtu)		-				
io-		:					

Name Coles Point WWTP  Address  Submitted by M & M Consulting; In	File 5249  Received 7/  Reported 7/	/27/2009 /29/2009	PHONE (419) 753-2448  FAX (419) 753-2949
	FEED ANALYSI	<u>S'REPORT</u>	
Sample Number		5222	
Description of Feedstuff	FORAGE REED CAN	ARY	
	AS IS BASIS	DRY BASIS	AS IS BASIS DRY BASIS
pH Moisture  Dry Matter Fat  Crude Protein  Digestable Protein  Kiber  Ash  NFE (Crude Carbohydrates)  Digestable Carbohydrates  TDN  ENE  Mcal/100 lbs  NE (Gain)  NE (Lactation)  Digestible Energy  Mcal/lb  Calcium  Ca  Phosphorus  Potassium  K  Magnesium  Mg  Sodium  Na  Sulfur,  S  Moisture  %  Moisture  %  Moal/lb  Mcal/lb  Mcal/lb  Mcal/lb  Mcal/lb  Mcal/lb  Mcal/lb  Mcal/lb	6.77 93.23 7.61 4.56 31.83 5.83 55.98 36.46 0.28 0.57 1.12 0.243 0.328 1.589 0.171 0.006	8.16 4.89 34.14 6.25 60.04 39.11 0.30 0.61 1.20 0.261 0.352 1.704 0.183 0.006	
Iron Fe ppm Manganese Mn ppm Copper Cu ppm Zinc Zn ppm	81.3 449.5 6.3 41.6	87.2 482.1 6.8 44.6	
Water-Soluble Nitrogen (NO ₃ ) % Ammonia (NH ₄ ) %			
Neutral Detergent Fiber % Acid Detergent Fiber % Unavailable Crude Protein (ADF-Protein) % Relative Feed Value	66.62 38.01	71.46 40.77 74.38	
	· · · · · · · · · · · · · · · · · · ·		

## O Biosolids Testing Results

### BROOKSIDE LABORATORIES, INC.

** FERTILIZER ANALYSIS REPORT **

oles Point WWTP

File Number: 52491

Date Received: 7/27/2009 Date Reported: 7/29/2009

Submitted By: M & M Consulting, Inc.

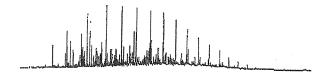
- Harring and the second secon

Lab Number P464
Description SLUDGE
CPWWTP
SLUDGE

	% Dry Basis	% As Is Basis	lbs/ Ton		•	
Moisture		42.99	859.80			
"Total Nitrogen (N).	5.49	3.13	62.60	•	•	
Avail, Phosphorus (P)	1.59	0.906	18.12	1		
Avail. Phos. as (P205)	3.64	2.075	41.50			
Potassium (K)	0.38	0.217	4.34			
Potassium as (K20)	0.46	0.262	5.24			

Reviewed by:

My Meyes



### ANALYTICAL LABORATORY REPORT

30-Jul-10

Westmoreland County Attn: Gary France P.O. Box 1000 Montross, Va. 22520

Project:

Coles Point

Date Received:

22-Jul-10

Date Sampled:

22-Jul-10

Work Order No:

1007164-02

Units of Measure:

mg/L

Client ID:	Sludge Sampl	e				
Test	Final	Reporting	Regulatory	Method	Date	Tech.
Description	Result	Limit	Level	Numbers*	Analyzed	Initials
TCLP Metals				SW-846		MARIO
Arsenic	<0.050	0.050	5.0	1311/6010B	28-Jul-10	HV
Barium	<0.020	0.020	100.0	1311/6010B	28-Jul-10	HV
Cadmium	<0.010	0.010	1.0	1311/6010B	28-Jul-10	HV
Chromium	<0.020	0.020	5.0	1311/6010B	28-Jul-10	HV
Lead	<0.050	0.050	5.0	1311/6010B	28-Jul-10	HV
Mercury	<0.002	0.002	0.2	1311/7471	27-Jul-10	HV
Selenium	<0.050	0.050	1.0	1311/6010B	28-Jul-10	HV
Silver	<0.020	0.020	5.0	1311/6010B	28-Jul-10	HV
TCLP Chlorinated	TAXABLE STATES OF TAXABLE STAT			•		
Pesticides		-		SW-846		
Methoxychlor	<0.0001	0.0001	10,0	1311/8082A	26-Jul-10	HV
Lindane	<0.0001	0.0001	0.4	1311/8082A	26-Jul-10	HV
Heptachlor	<0.0001	0.0001	0.008	1311/8082A	26-Jul-10	HV
Heptachlor epoxide	<0.0001	0.0001	800.0	1311/8082A	26-Jul-10	HV
Endrin	<0.0001	0.0001	0.02	1311/8082A	26-Jul-10	HV
Chlordane	<0.0005	0.0005	0.03	1311/8082A	26-Jul-10	HV
Тохарнепе	<0.002	0.002	0.5	1311/8082A	26-Jul-10	HV
			···			

## Primary Laboratories, Inc. Results

30-Jul-10

Date Sampled:

22-Jul-10 1007164-02

Work Order No: Units of Measure:

mg/L

Client ID:

Sludge Sample

Test	Peas 2					
	Final	Reporting	Regulatory	Method	Date	Tech.
Description	Result	Limit	Level	Numbers*	Analyzed	Initials
TCLP Herbicides	· ·			0181040		
2,4-D	<0.01	0.01	10.0	SW-846	20.114	
2,4,5-TP (Silvex)	<0.002	0,002	1.0	1311/8151A	26-Jul-10	HV
2,4,0-17 (SIIVEX)	\0.002	0.002	1.0	1311/8151A	26-Jul-10	HV
TCLP Volatiles	Later Company			SW-846		
Benzene	<0.005	0.005	0.5	1311/8260B	27-Jul-10	PB
2-Butanone (MEK)	<0.100	0.100	200.0	1311/8260B	27-Jul-10	PB
Carbon tetrachloride	<0.005	0.005	0.5	1311/8260B	27-Jul-10	PB
Chlorobenzene	<0.005	0.005	100.0	1311/8260B	27-Jul-10	РВ
Chloroform	<0.005	0.005	6	1311/8260B	27-Jul-10	PB
1,2-Dichloroethane	<0.005	0.005	0.5	1311/8260B	27-Jul-10	PB
1,1-Dichloroethene	<0.005	0,005	0.7	1311/8260B	27-Jul-10	PB
Tetrachloroethene	<0,005	0.005	0.7	1311/8260B	27-Jul-10	PB
Trichloroethene	<0.005	0.005	0.5	1311/82608	27-Jul-10	PB
Vinyl Chloride	<0.010	0.010	0,2	1311/8260B	27-Jul-10	PB
TCLP Semivolatiles				SW-846		
o-Cresol	< 0.010	0.010	200.0	1311/8270C	26-Jul-10	HV
m-Cresol	<0.010	0.010	200.0	1311/8270C	26-Jul-10	HV
p-Cresol	< 0.010	0.010	200.0	1311/8270C	26-Jul-10	HV
Cresol (Total)	<0.030	0.030	200.0	1311/8270C	26-Jul-10	HV
1,4-Dichlorobenzene	<0.010	0.010	7.5	1311/8270C	26-Jul-10	HV
2,4-Dinitrotoluene	<0.050	0.050	0.1	1311/8270C	26-Jul-10	HV
Hexachlorobenzene	<0.010	0.010	0.13	1311/8270C	26-Jul-10	HV
Hexachlorobutadiene	<0.010	0.010	0.5	1311/8270C	26-Jul-10	HV
Hexachloroethane	<0.010	0.010	3.0	1311/8270C	26-Jul-10	HV
Nitrobenzene	<0.010	0.010	2.0	1311/8270C	26-Jul-10	HV
Pentachlorophenol	<0.050	0.050	100,0	1311/8270C	26-Jul-10	HV
Pyridine	<0,020	0.020	5.0	1311/8270C	26-Jul-10	HV
2,4,5-Trichlorophenol	<0.010	0.010	400.0	1311/8270C	26-Jul-10	HV
2,4,6-Trichlorophenol	<0.010	0.010	2.0	1311/8270C	26-Jul-10	HV

## Primary Laboratories, Inc. Results

30-Jul-10

Date Sampled:

22-Jul-10

Work Order No:

1007164-02

Client ID:

Sludge Sample

WHENT SING	owning commit	<del>-</del>				
Test	Final	Reporting	Units of	Method	Date	Tech.
Description	Result	Limit	Measure	Numbers*	Analyzed	Initials
				SW-846		***
TPH, Gasoline Range	<5	5	mg/Kg	5030/8015B(M)	26-Jul-10	HV
				SW-846		
TPH, Diesel Range	<10	10	mg/Kg	3550/8015B(M)	26-Jul-10	HV
		-001 months are the control of the c			Na communicación de la com	

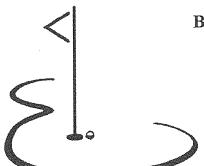
^{*} All methods are Standard Methods 18th Edition unless otherwise noted.

Signature:	Date:	
Parry L. Bragg		

Parry L. Bragg Laboratory Manager

These analytical results are based upon materials provided by the client and are intended for the exclusive use of the client. These analytical results represent the bast judgement of Primary Laboratories, Inc. Primary Laboratories, Inc. assumes no responsibility, express or implied, as to the interpretation of the analytical results contained in this report. This report is not to be reproduced except with the written approval of Primary Laboratories, Inc.

P Soil Hydraulic Conductivity



### BROOKSIDE LABORATORIES, INC.

GEOTECHNICAL DIVISION NEW BREMEN, OH 45869

PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

Date Received/Started : 04/22/2013

Date Completed/Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

Lab Number

Sample Description

LAND APP. SITES

FIELD 1

Α

Sample Condition

Normal XX

Other (see comments)

### Method References

ASTM F1647 - Method A

*Reported values are an average of duplicated analysis



Geotechnical (Putting Green Materials) Certificate Number: 736.01

^{*} These results represent the sample submitted only.

Brookside Laboratories, Inc.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491 ** Date of Analysis **

Start Date : 04/22/2013

Completed :

04/23/2013

Submitted By: M & M Consulting, Inc.

Reviewed by:

Lab Number

0362

Sample Description LAND APP. SITES

FIELD 1

Α

Org Mat 360 deg C (LOI)

3.44

## BROOKSIDE LABORATORIES, INC. GEOTECHNICAL DIVISION NEW BREMEN, OH 45869

51.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

Date Received/Started : 04/22/2013

Date Completed/Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

Lab Number

Sample Description

0363

LAND APP. SITES

FIELD 1

В

Sample Condition

XX Normal

Other (see comments)

### Method References

ASTM F1647 - Method A

*Reported values are an average of duplicated analysis



Geotechnical (Putting Green Materials) Certificate Number: 736.01

^{*} This report may only be reproduced in its entirety.

^{*} These results represent the sample submitted only.

Brookside Laboratories, Inc.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

** Date of Analysis **

Start Date : 04/22/2013 Completed :

04/23/2013

Submitted By: M & M Consulting, Inc.

Reviewed by:

Lab Number

0363

Sample Description

LAND APP. SITES

FIELD 1

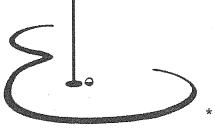
В

Org Mat 360 deg C (LOI)

3.29

### BROOKSIDE LABORATORIES, INC.

GEOTECHNICAL DIVISION NEW BREMEN, OH 45869



** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

Date Received/Started : 04/22/2013

Date Completed/Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

Lab Number

Sample Description

0364

LAND APP. SITES

FIELD 2

A

Sample Condition

XX Normal

Other (see comments)

### Method References

ASTM F1647 - Method A

*Reported values are an average of duplicated analysis



Geotechnical (Putting Green Materials) Certificate Number: 736.01

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^{*} These results represent the sample submitted only.

Brookside Laboratories, Inc.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

** Date of Analysis **

Start Date : 04/22/2013

Completed :

04/23/2013

Submitted By: M & M Consulting, Inc.

Reviewed by:

Lab Number

0364

Sample Description

LAND APP. SITES

FIELD 2

Α

Org Mat 360 deg C (LOI)

4.93

### BROOKSIDE LABORATORIES, INC.

GEOTECHNICAL DIVISION NEW BREMEN, OH 45869

PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number:

Date Received/Started :

04/22/2013

Date Completed/Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

Lab Number

Sample Description

0365

LAND APP. SITES

FIELD 2

В

Sample Condition

XXNormal Other (see comments)

### Method References

ASTM F1647 - Method A

*Reported values are an average of duplicated analysis



Geotechnical (Putting Green Materials) Certificate Number: 736.01

^{*} This report may only be reproduced in its entirety.

^{*} These results represent the sample submitted only.

Brookside Laboratories, Inc.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

** Date of Analysis **

Completed :

Start Date : 04/22/2013 04/23/2013

Submitted By: M & M Consulting, Inc.

Reviewed by:

Lab Number

0365

Sample Description

LAND APP. SITES

FIELD 2

· B

Org Mat 360 deg C (LOI)

6.91



### BROOKSIDE LABORATORIES, INC.

GEOTECHNICAL DIVISION NEW BREMEN, OH 45869

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

Date Received/Started : 04/22/2013

Date Completed/Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

Lab Number

Sample Description

0366

LAND APP. SITES

FIELD 3

Α

Sample Condition

XX Normal

Other (see comments)

### Method References

ASTM F1647 - Method A

*Reported values are an average of duplicated analysis



Geotechnical
(Putting Green Materials)
Certificate Number: 736.01

^{*} This report may only be reproduced in its entirety.

st These results represent the sample submitted only.

Brookside Laboratories, Inc.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

** Date of Analysis **

Start Date : 04/22/2013 Completed :

04/23/2013

Submitted By: M & M Consulting, Inc.

Reviewed by:

Lab Number

0366

Sample Description

LAND APP. SITES

FIELD 3

Α

Org Mat 360 deg C (LOI)

6.15

### BROOKSIDE LABORATORIES, INC. GEOTECHNICAL DIVISION

NEW BREMEN, OH 45869

PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

Date Received/Started : 04/22/2013

Date Completed/Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

Lab Number

Sample Description

0367

LAND APP. SITES

FIELD 3

Sample Condition

Normal XX

Other (see comments)

### Method References

ASTM F1647 - Method A

*Reported values are an average of duplicated analysis



Geotechnical (Putting Green Materials) Certificate Number: 736.01

^{*} This report may only be reproduced in its entirety.

^{*} These results represent the sample submitted only.

Brookside Laboratories, Inc.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

** Date of Analysis **

Completed :

Start Date : 04/22/2013 04/23/2013

Submitted By: M & M Consulting, Inc.

Reviewed by:

Lab Number

0367

Sample Description

LAND APP. SITES

FIELD 3

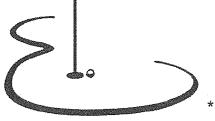
В

Org Mat 360 deg C (LOI)

3.01

### BROOKSIDE LABORATORIES, INC.

GEOTECHNICAL DIVISION NEW BREMEN, OH 45869



PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

Date Received/Started : 04/22/2013

Date Completed/Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

Lab Number

Sample Description

0368

LAND APP. SITES

FIELD 1B

6 "

Sample Condition

Normal XX

Other (see comments)

#### Method References

ASTM F1647 - Method A

*Reported values are an average of duplicated analysis



Geotechnical (Putting Green Materials) Certificate Number: 736.01

^{*} This report may only be reproduced in its entirety.

^{*} These results represent the sample submitted only.

Brookside Laboratories, Inc.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

** Date of Analysis **

Start Date : Completed :

04/22/2013 04/23/2013

Submitted By: M & M Consulting, Inc.

Reviewed by:

Jackie Brackman

Lab Number

0368

Sample Description

LAND APP. SITES

FIELD 1B

6 "

Org Mat 360 deg C (LOI)

1.60

# BROOKSIDE LABORATORIES, INC.

** PHYSICAL ANALYSIS REPORT **

Coles Point WWTP

File Number: 52491

Date Received: 04/22/2013

Date Reported: 04/23/2013

Submitted By: M & M Consulting, Inc.

SAMPLI	E LOCATION:	LAND APP. SITE	LS			
NBR	FIELD	DESCRIPTION	Clay (%)	Silt (%)	Sand (%)	
001 002 003 004 005 006 007	FIELD 1 FIELD 2 FIELD 2 FIELD 3 FIELD 3 FIELD 1B	A B A B A B	21.80 17.36 18.91 22.68 24.21 13.46 18.99	36.75 34.26 33.51 34.71 29.68 29.82 34.23	41.45 48.38 47.58 42.61 46.11 56.72 46.78	



Report Date	04/23/2013
Client Name	Coles Point WWTP
File Number	52491
Consultant	M & M Consulting, Inc.

Sample Description LAND APP. SITES FIELD 1 A		en non-sommere
Weight of tube (g)	187.32	
Weight of tube + material (g)	645.39	
Wet weight of tube + material (g)	656.76	
Pounds of wet material per cubic foot*	120.4	
Soil depth (mm)	120	
Water depth (mm)	30	
Time to drain (s)	15000	
Volume of cylinder (cubic inches)	14.8	
Height (mm) rim to surface of material	30	
Estimated saturated hydraulic conductivity (mm/hour)	< 2.1	
Estimated saturated hydraulic conductivity (in/hour)	< 0.1	

^{*}Pounds of wet material per cubic foot is an estimate when water is still flowing through sample. Note: Method used is from Practical Drainage for Golf, Sportsturf, and Horticulture



Report Date 04/23/2013

Client Name Coles Point WWTP

File Number 52491

Consultant M & M Consulting, Inc.

Sample Description LAND APP. SITES FIELD 1 B		
Weight of tube (g)	194.33	
Weight of tube + material (g)	595.19	
Wet weight of tube + material (g)	622.74	
Pounds of wet material per cubic foot*	125.6	
Soil depth (mm)	105	
Water depth (mm)	45	
Time to drain (s)	2429	
Volume of cylinder (cubic inches)	13.0	
Height (mm) rim to surface of material	45	
Estimated saturated hydraulic conductivity (mm/hour)	5.6	
Estimated saturated hydraulic conductivity (in/hour)	0.2	

^{*}Pounds of wet material per cubic foot is an estimate when water is still flowing through sample. Note: Method used is from Practical Drainage for Golf, Sportsturf, and Horticulture



Report Date	04/23/2013
Client Name	Coles Point WWTP
File Number	52491
Consultant	M & M Consulting, Inc.

Sample Description	LAND APP. SITES FIELD 2 A	
Sample Description		
Weight of tube (g)	•	187.80
Weight of tube + materi	al (g)	588.86
Wet weight of tube + ma	aterial (g)	597.69
Pounds of wet material	per cubic foot*	114.7
Soil depth (mm)		110
Water depth (mm)		40
Time to drain (s)		15000
Volume of cylinder (cubic inches)		13.6
Height (mm) rim to surface of material		40
Estimated saturated hydraulic conductivity (mm/hour)		< 2.1
Estimated saturated hy	draulic conductivity (in/hour)	< 0.1

^{*}Pounds of wet material per cubic foot is an estimate when water is still flowing through sample. Note: Method used is from Practical Drainage for Golf, Sportsturf, and Horticulture



Report Date	04/23/2013
Client Name	Coles Point WWTP
File Number	52491
Consultant	M & M Consulting, Inc.

Sample Description LAND APP. SITES FIELD 2 B		
Weight of tube (g)	189.33	
Weight of tube + material (g)	557.89	
Wet weight of tube + material (g)	569.86	
Pounds of wet material per cubic foot*	111.5	
Soil depth (mm)	105	
Water depth (mm)	45	
Time to drain (s)	15000	
Volume of cylinder (cubic inches)	13.0	
Height (mm) rim to surface of material	45	
Estimated saturated hydraulic conductivity (mm/hour)	< 2.1	
Estimated saturated hydraulic conductivity (in/hour)	< 0.1	

^{*}Pounds of wet material per cubic foot is an estimate when water is still flowing through sample. Note: Method used is from Practical Drainage for Golf, Sportsturf, and Horticulture



Report Date	04/23/2013
Client Name	Coles Point WWTP
File Number	52491
Consultant	M & M Consulting, Inc.

Sample Description LAND APP. SITES FIELD 3 A		
Beach and the second se		
Weight of tube (g)	191.53	
Weight of tube + material (g)	516.80	
Wet weight of tube + material (g)	552.65	
Pounds of wet material per cubic foot*	117.0	
Soil depth (mm)	95	
Water depth (mm)	55	
Time to drain (s)	475	
Volume of cylinder (cubic inches)	11.7	
Height (mm) rim to surface of material	55	•
Estimated saturated hydraulic conductivity (mm/hour)	30.4	
Estimated saturated hydraulic conductivity (in/hour)	1.2	

^{*}Pounds of wet material per cubic foot is an estimate when water is still flowing through sample. Note: Method used is from Practical Drainage for Golf, Sportsturf, and Horticulture



Report Date	04/23/2013
Client Name	Coles Point WWTP
File Number	52491
Consultant	M & M Consulting, Inc.

Sample Description LAND APP. SITES FIELD 3 B		
Campio Docompania		
Weight of tube (g)	189.54	
Weight of tube + material (g)	523.55	
Wet weight of tube + material (g)	587.22	
Pounds of wet material per cubic foot*	116.6	
Soil depth (mm)	105	
Water depth (mm)	45	
Time to drain (s)	994	
Volume of cylinder (cubic inches)	13.0	
Height (mm) rim to surface of material	45	
Estimated saturated hydraulic conductivity (mm/hour)	13.8	
Estimated saturated hydraulic conductivity (in/hour)	0.5	

^{*}Pounds of wet material per cubic foot is an estimate when water is still flowing through sample. Note: Method used is from Practical Drainage for Golf, Sportsturf, and Horticulture



Report Date 04/23/2013

Client Name Coles Point WWTP

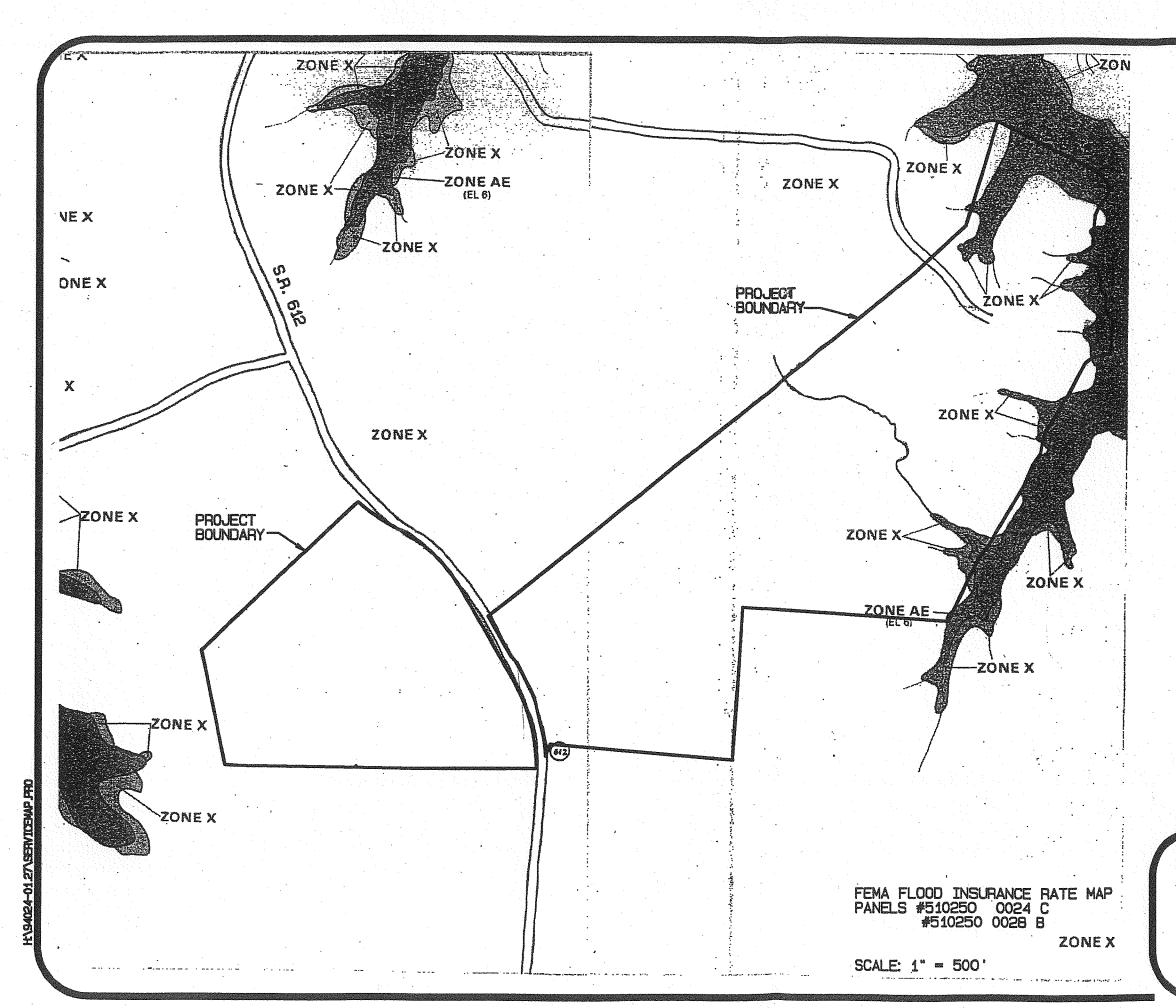
File Number 52491

Consultant M & M Consulting, Inc.

Sample Description LAND APP. SITES FIELD 1B 6"		
Weight of tube (g)	400.24	
<u> </u>	192.34	
Weight of tube + material (g)	556.29	
Wet weight of tube + material (g)	575.31	
Pounds of wet material per cubic foot*	124.1	
Soil depth (mm)	95	
Water depth (mm)	55	
Time to drain (s)	318	
Volume of cylinder (cubic inches)	11.7	
Height (mm) rim to surface of material	55	
Estimated saturated hydraulic conductivity (mm/hour)	45.4	
Estimated saturated hydraulic conductivity (in/hour)	1.8	

^{*}Pounds of wet material per cubic foot is an estimate when water is still flowing through sample. Note: Method used is from Practical Drainage for Golf, Sportsturf, and Horticulture

Q FEMA Flood Map



#### LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base floud elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Field dapths of 1 to 3 feet (usually areas of sonding); best flood elevations determined.

Flood depths of 1 to 3 feet justally sheet flow on sloping terrain); average depths determined. For usess of sikevial fan flood-ing, velocities siso determined. ZONE AO

ZOME A99 To be protected from 100-year flood by Federal flood protection system under

Coastal flood with velocity hazard (wave

ZONE VE Coastal flows with relocity hatard (water action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE



#### OTHER FLOOD AREAS

Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levers from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year flood plain,

ZONE D Areas in which flood hazards are

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

Base Flood Elevation Line, Elevation in Feet*

Cross Section Line

(EL 987)

Base Flood Elevation in Feet Where Uniform Within Zone*

Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

FIGURE 8
FEMA FLOOD INSURANCE RATE MAP
COLES POINT WASTEWATER
TREATMENT FACILITY WESTMORELAND COUNTY, VIRGINIA



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